

**The Most Comprehensive
Preparation App For All Exams**

CIRCLE

Part-III

Agenda : Circles Part 3

* Common Tangents

+ Common Chords

Homework

400

Doubt Session

18th January

CIRCLES →

100 Questions

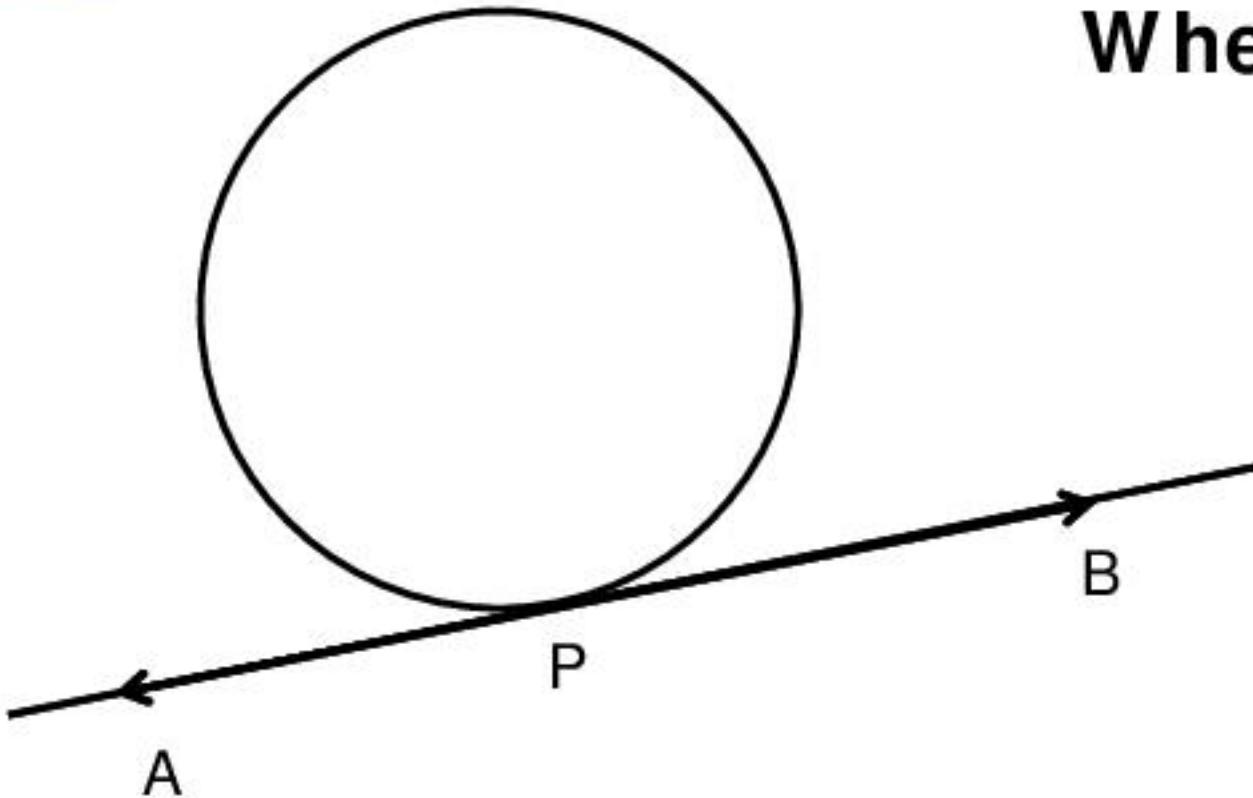
for Doubts

submit all your doubts to me

before

Mon

11am



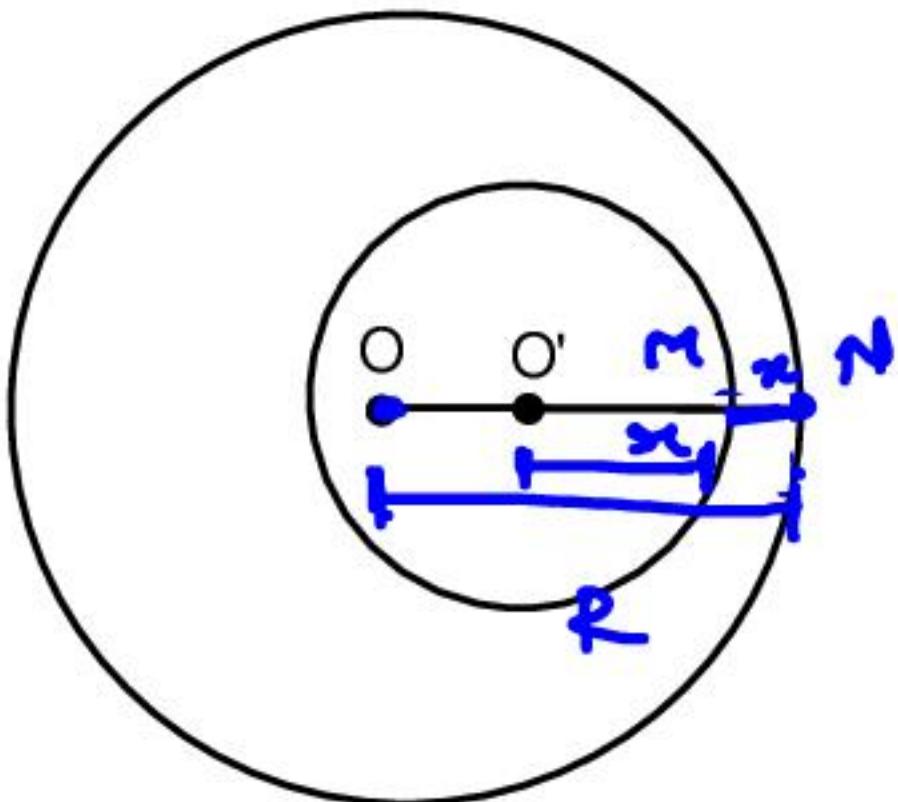
Where, P = Point of contact
AB = Tangent

Common Tangent :

A tangent which is common to both the circles.

Case I: **No common tangent :**

(When one circle lies inside another.)

Radius of smaller circle = r Radius of bigger circle = R

$$ON = r$$

$$O'M = x$$

$$MN = x$$

$$OO' < R - r$$

$$OO' = R - x - x$$

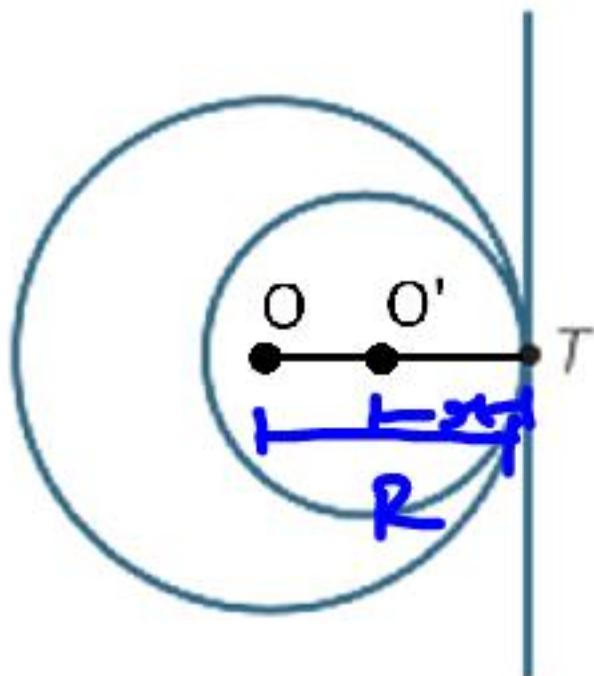
$$OO' < R - x$$

where OO'

→ Distance b/w centres
of 2 circles

Case II:**One common tangent**

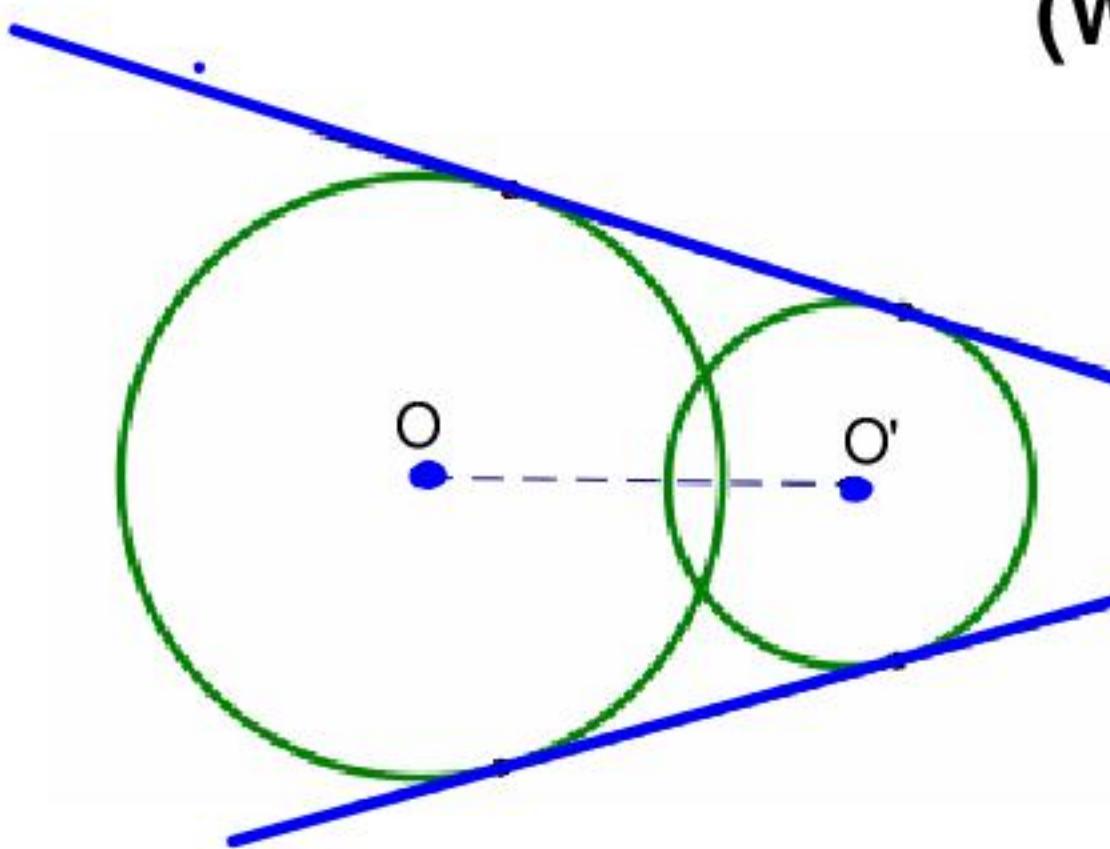
(When the circles touch each other internally)



Radius of smaller circle = r

Radius of bigger circle = R

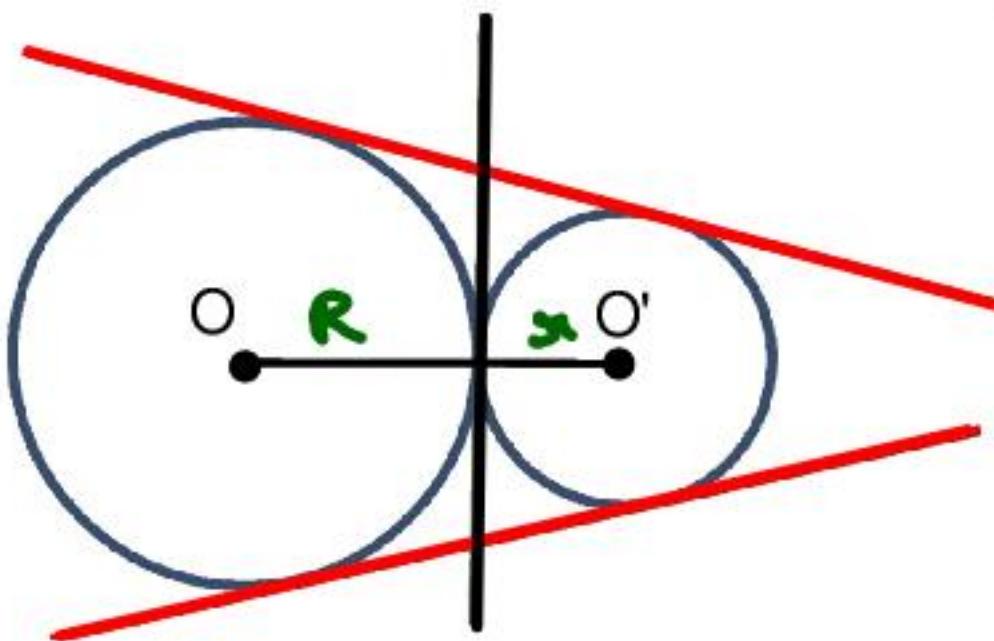
$$OO' = R - r$$

Case III:**Two common tangent**(When two circles intersect each other)Radius of smaller circle = r Radius of bigger circle = R

$$R - r < OO' < R + r$$

Case IV: Three common tangent

(When two circles touch each other externally)



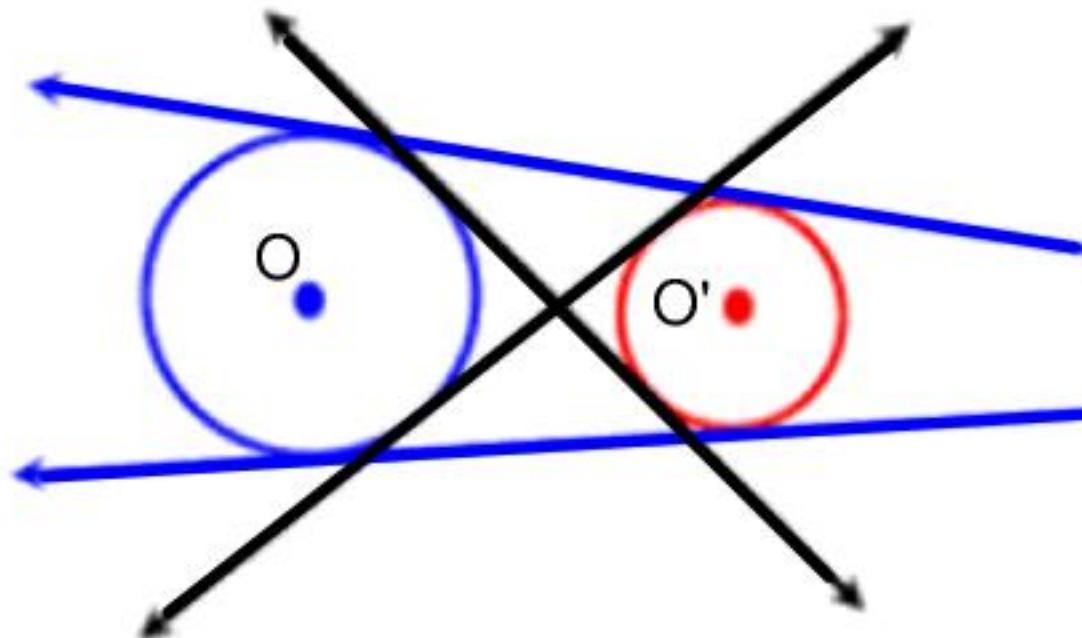
Radius of smaller circle = r

Radius of bigger circle = R

$$OO' = R + r$$

Case V: Four common tangent

(When two circles are at some distance.)



Radius of smaller circle = r

Radius of bigger circle = R

$$OO' > R + r$$

$$OO' < R - \alpha$$

0

$$OO' = R - \alpha$$

1

$$R - \alpha < OO' < R + \alpha$$

2

$$OO' = R + \alpha$$

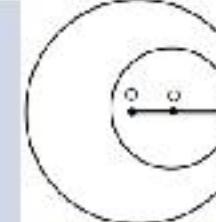
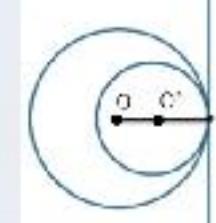
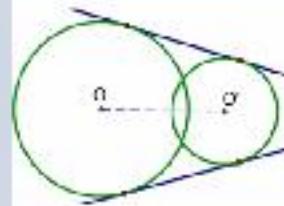
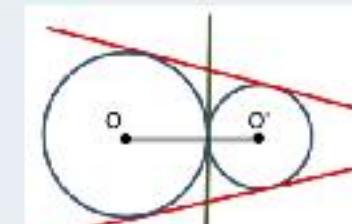
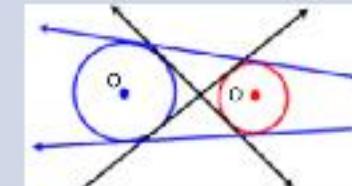
3

$$OO' > R + \alpha$$

4

V. Anuj

COMMON TANGENT

Case	Figure	Common Tangent	Cord ^N
I		0	$OO' < R - r$
II		1	$OO' = R - r$
III		2	$R - r < OO' < R + r$
IV		3	$OO' = R + r$
V		4	$OO' > R + r$

Eg. If area of two circles are 576π and 729π and the distance between their centres is 64 units. How many common tangents can be drawn to these circles?

$$\pi r^2 = 576\pi$$

$$\pi R^2 = 729\pi$$

$$\underline{\underline{r = 24}}$$

$$\underline{\underline{R = 27}}$$

$$OO' > R+r$$

4 common Tangents

Ans. 4 common tangents

Direct Common Tangent (DCT)

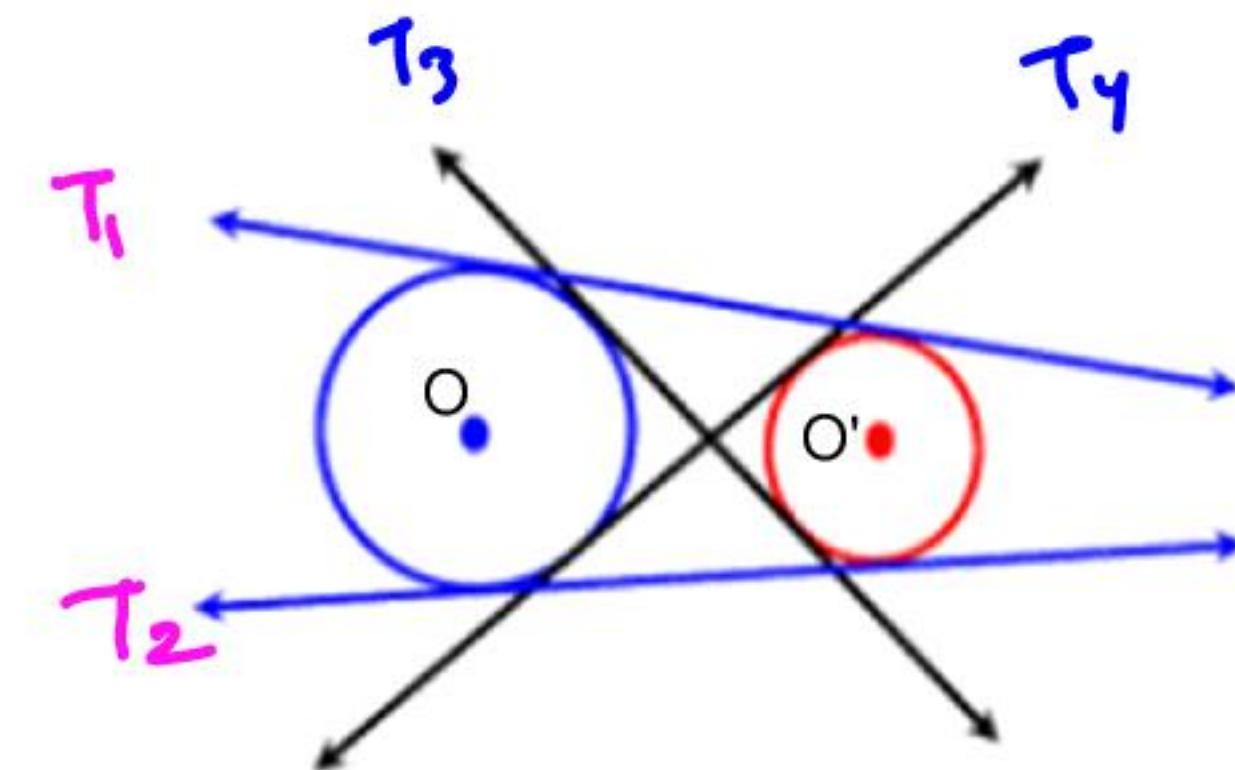
If both the circles are on same side of tangent.

T_1 & T_2 are DCT

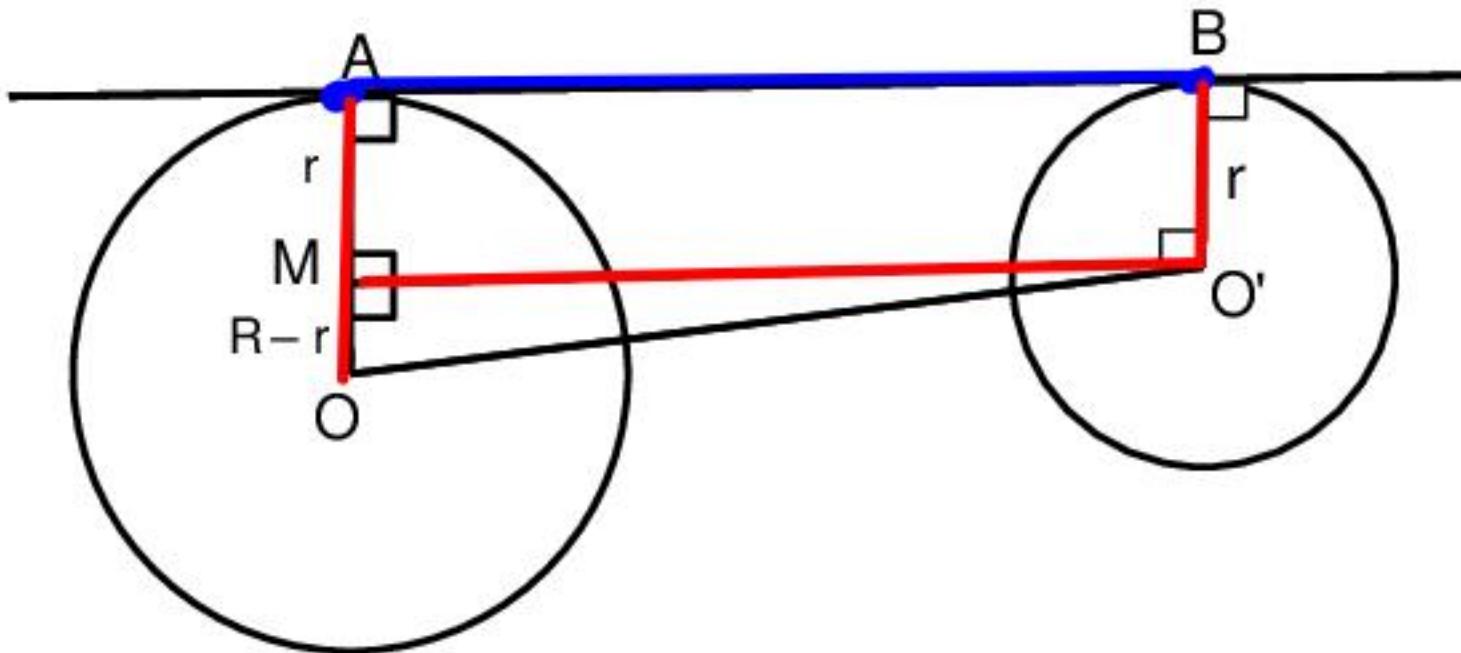
Transverse Common Tangent (TCT)

If the circles lie on opposite side of tangent.

T_3 & T_4 are TCT



Length of Direct Common Tangent


 $\triangle OO'M$

$$(OO')^2 = (OM)^2 + (O'M)^2$$

$$(OO')^2 = (R-r)^2 + (AB)^2$$

$$AB = \sqrt{(OO')^2 - (R-r)^2}$$

$$\text{Length of Direct Common Tangent} = \sqrt{(O O')^2 - (R - r)^2}$$

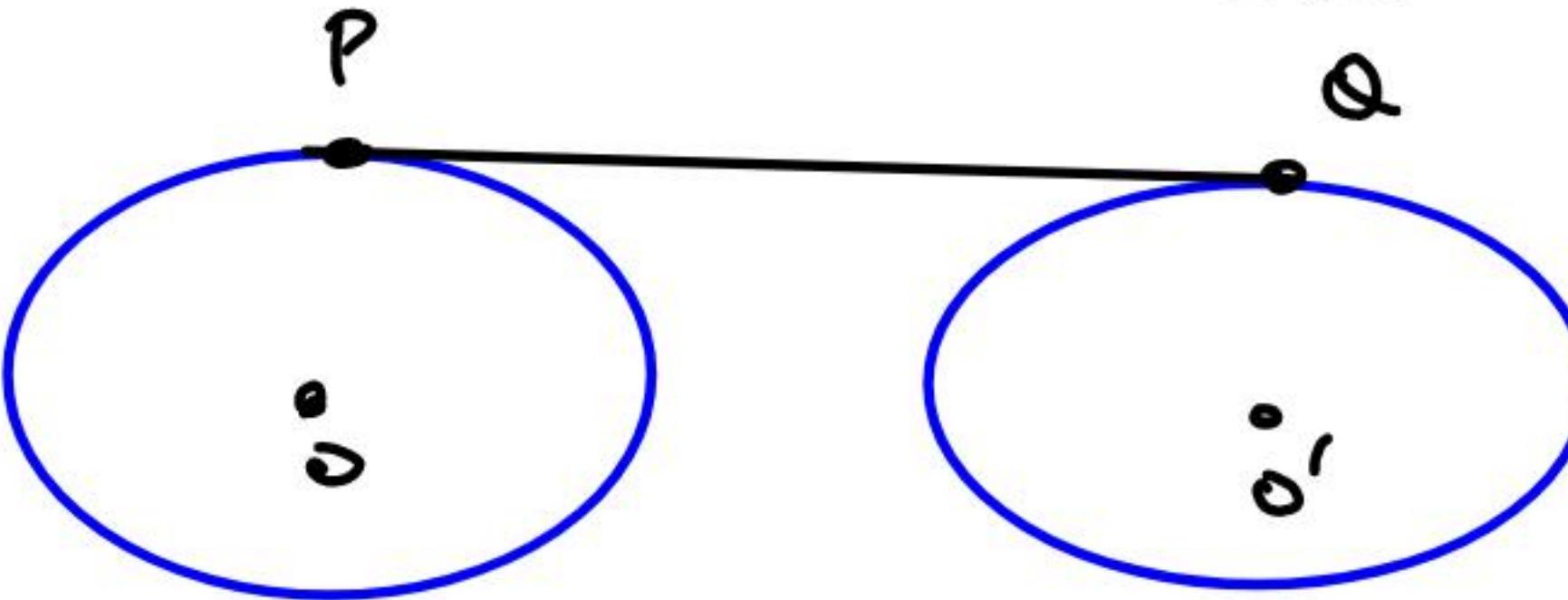
where $O O' \rightarrow$ Distance b/w centres
of circles

R_1 & r are radii of circles

(1) If radius of both the circles are same ($R = r$)

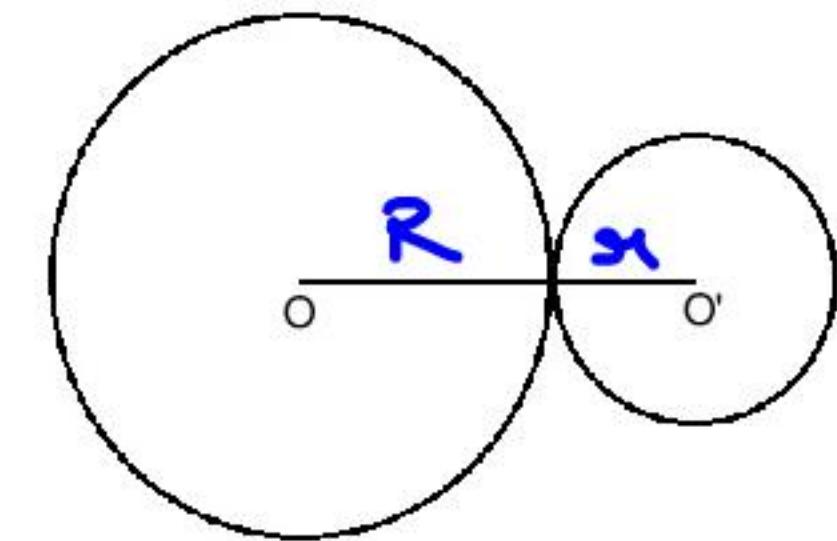
$$\text{Length of Direct Common Tangent} = \sqrt{(O O')^2 - (R - r)^2}$$

= 00



$$PQ = 00'$$

(2) If 2 circles touch each other externally



$$\begin{aligned}\text{Length of Direct Common Tangent} &= \sqrt{(OO')^2 - (R - r)^2} \\ &= \sqrt{(R + r)^2 - (R - r)^2} = \sqrt{4Rr} \\ &= \underline{\underline{2\sqrt{Rr}}}\end{aligned}$$

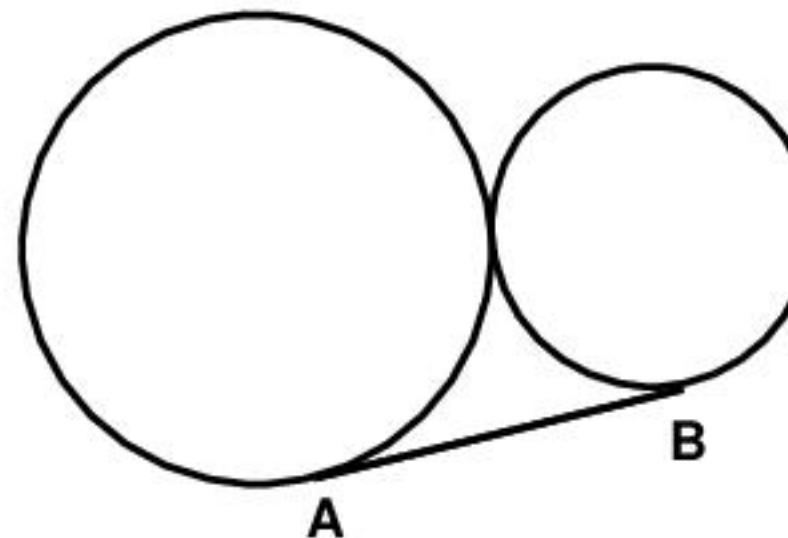
Eg1. $R = 16 \text{ cm}$

$r = 9 \text{ cm}$

Find AB.

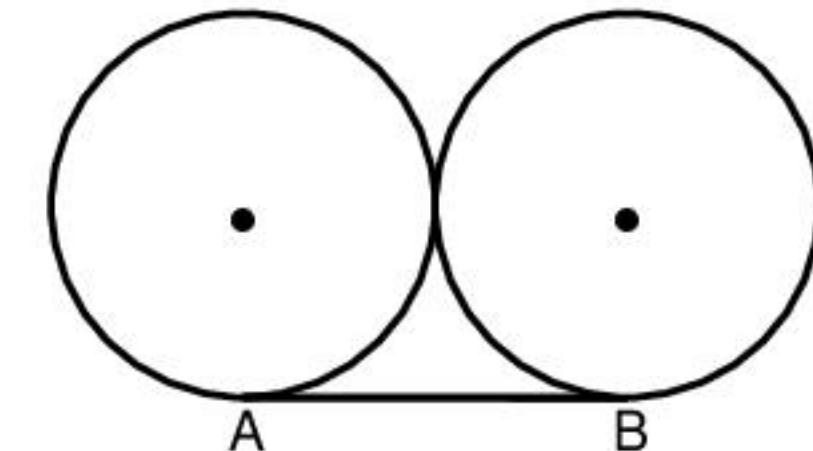
$$AB = 2\sqrt{16 \cdot 9}$$

$$= \underline{\underline{24 \text{ cm}}}$$



Ans. AB = 24 cm

(3) If radius of both the circles is same and they touch each other externally.

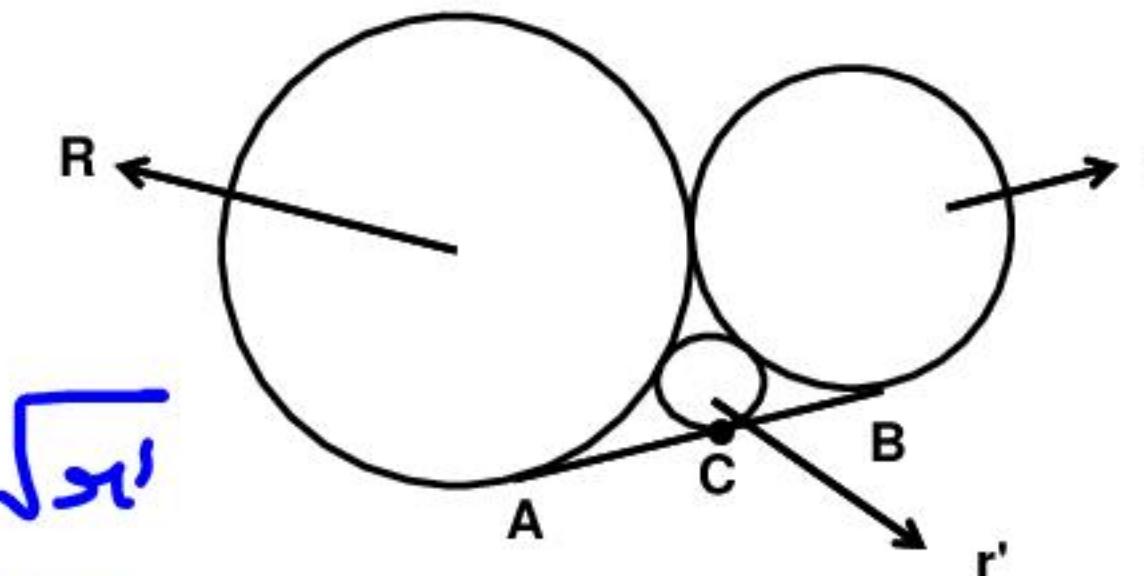


Length of Direct Common Tangent AB

$$= \sqrt{(OO')^2 - (R - r)^2}$$

$$= 2\sqrt{Rr}$$

$$= \underline{\underline{2 R}}$$

Eg2. $R = 16 \text{ cm}$ $r = 9 \text{ cm}$ Find r' .

$$AC = 2\sqrt{16\pi^1} \Rightarrow 8\sqrt{\pi^1}$$

$$CB = 2\sqrt{9\cdot\pi^1} = 6\sqrt{\pi^1}$$

$$AB = 2\sqrt{16 \cdot 9} = 24$$

$$AB = AC + CB$$

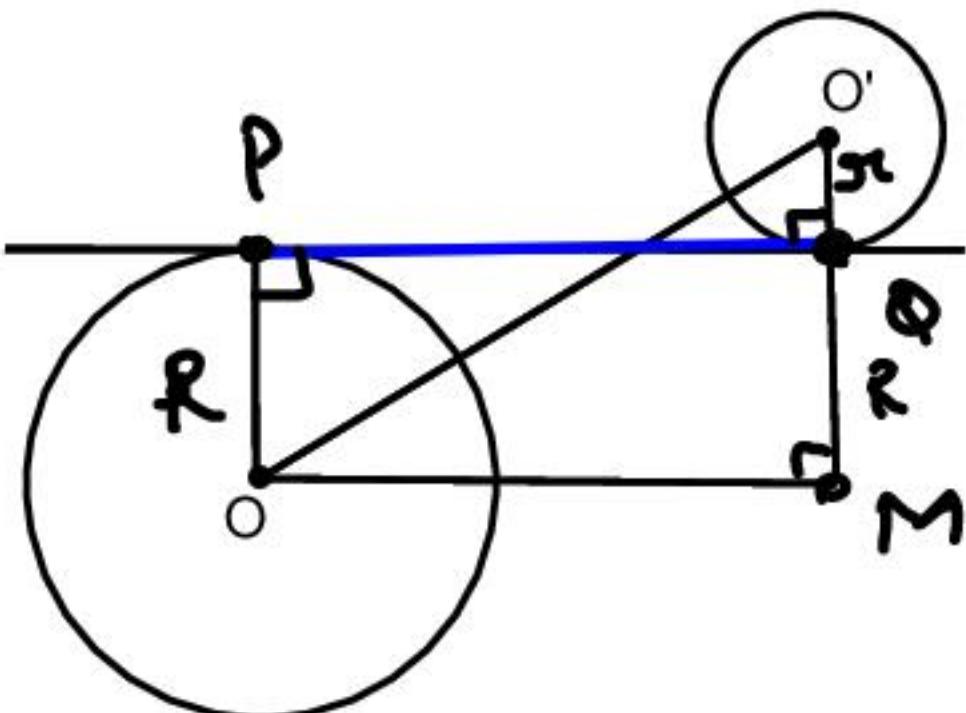
$$24 = 14\sqrt{\pi^1}$$

$$\sqrt{\pi^1} = \frac{24}{14}^{12} \pi$$

~~$\pi^1 = \frac{144}{49}$~~

$$\text{Ans. } r' = \frac{144}{49} \text{ cm}$$

Length of Transverse Common Tangent



$\triangle O'OM$

$$(O'O)^2 = (O'M)^2 + (OM)^2$$

$$(O'O)^2 = (R+r)^2 + (PO)^2$$

$$PO = \sqrt{(O'O)^2 - (R+r)^2}$$

Length of Transverse Common Tangent = $\sqrt{(OO')^2 - (R + r)^2}$

Bigger DCT = $\sqrt{(OO')^2 - (R - r)^2}$

Smaller TCT = $\sqrt{(OO')^2 - (R + r)^2}$

Length of Direct Common Tangent = $\sqrt{(OO')^2 - (R - r)^2}$

Length of Transverse Common Tangent = $\sqrt{(OO')^2 - (R + r)^2}$

Note:

- (i) Length of Direct Common Tangent is always greater than Transverse Common Tangent.
- (ii) Length of Transverse Common Tangent exist only if $OO' > R + r$, where OO' is distance between their centres.

$$TCT = \sqrt{(OO')^2 - (R+r)^2}$$

Eg3. Find the length of Direct Common Tangent

$$r = 3 \text{ cm}$$

$$R = 8 \text{ cm}$$

$$OO' = 13 \text{ cm}$$

$$\begin{aligned} DCT &= \sqrt{(OO')^2 - (R-r)^2} \\ &= \sqrt{13^2 - 5^2} \\ &= 12 \text{ cm} \end{aligned}$$

Ans. 12 cm

Eg4. Length of Direct Common Tangent = 15 cm

$$\underline{r = 4 \text{ cm}}$$

$$\underline{R = 12 \text{ cm}}$$

Find the length of Transverse Common Tangent.

$$15^2 = (O O')^2 - (R-r)^2$$

$$O O' = 17$$

$$T C T = \sqrt{(O O')^2 - (R+r)^2}$$

$$= \sqrt{17^2 - 16^2} = \underline{\underline{\sqrt{33}}}$$

Ans. $\sqrt{33}$ cm

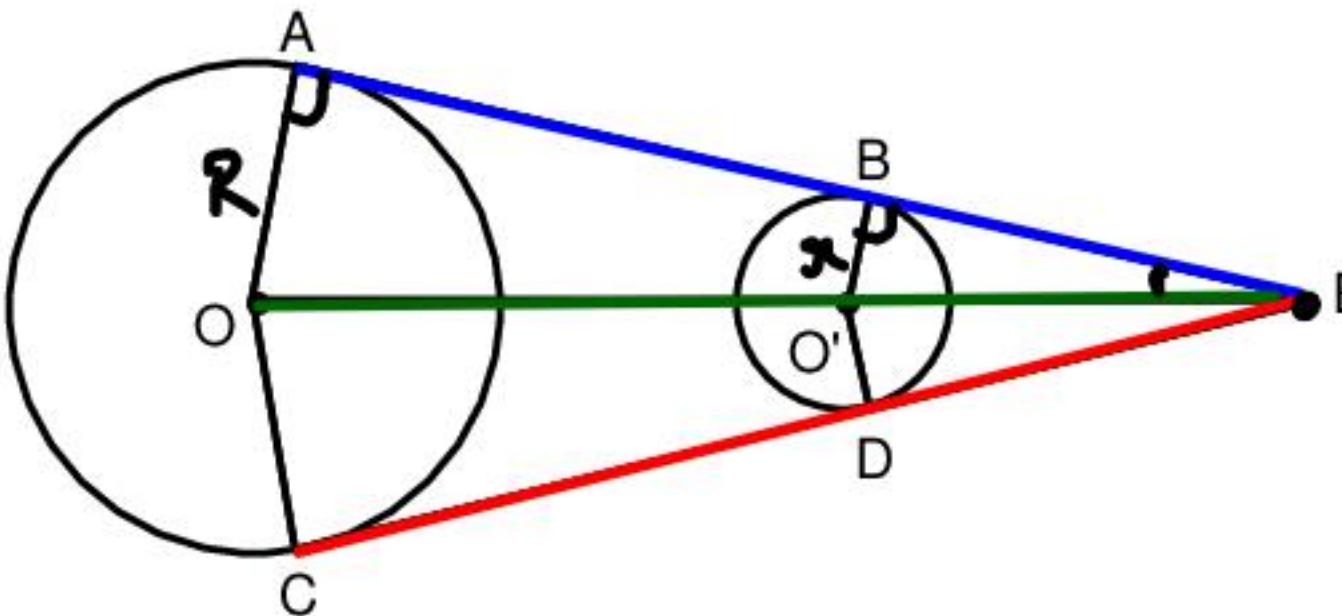
Eg5. Two circles C_1 and C_2 touch each other internally at P. Two lines PCA and PDB meet the circles C_1 , in C, D and C_2 in A, B respectively. If $\angle BDC = 120^\circ$, the value of $\angle ABD$ is equal to:

Don't

- (a) 60°
- (b) 80°
- (c) 100°
- (d) 120°

Ans. (a)

Point E divides $O O'$ externally in $R : r$



$$\triangle OEA \sim \triangle O'EB$$

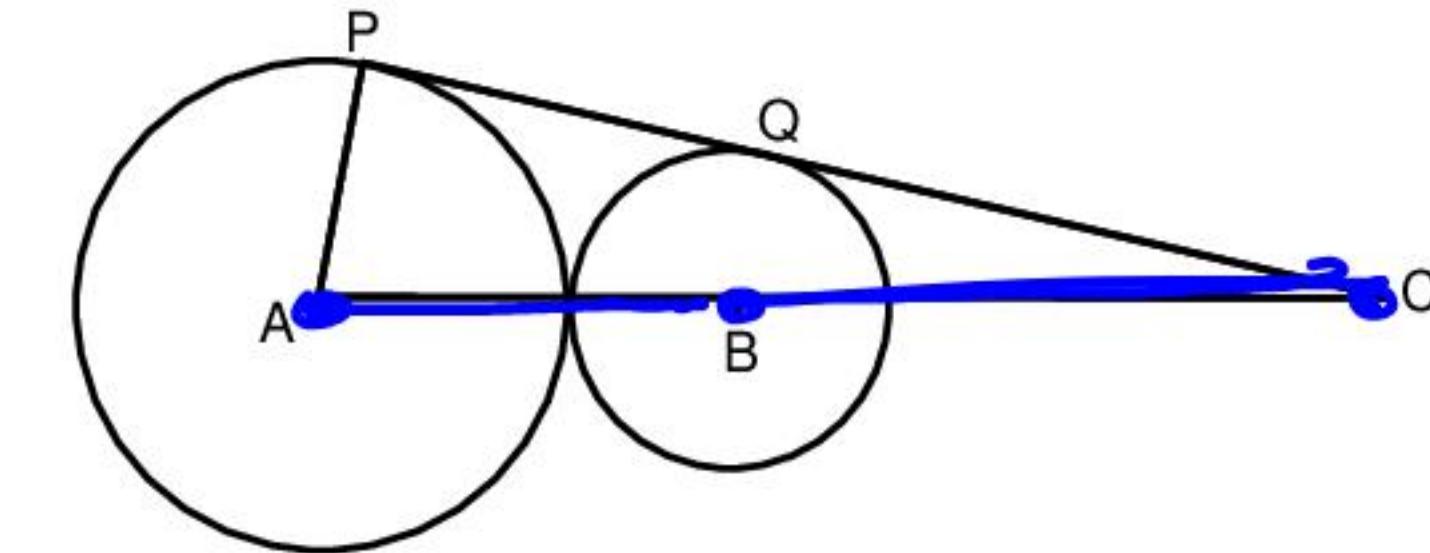
$$\frac{OE}{O'E} = \frac{OA}{O'B}$$

$$\frac{OE}{O'E} = \frac{R}{r}$$

Point E divides $O O'$ externally in $R : r$

Eg6. Two circles are touching each other as shown in the figure. The line joining the centres of two circles when extended meet the common tangents at point C. Ratio of diameter is $2 : 1$ and $\underline{\text{AB}} = 12 \text{ cm}$. Find BC.

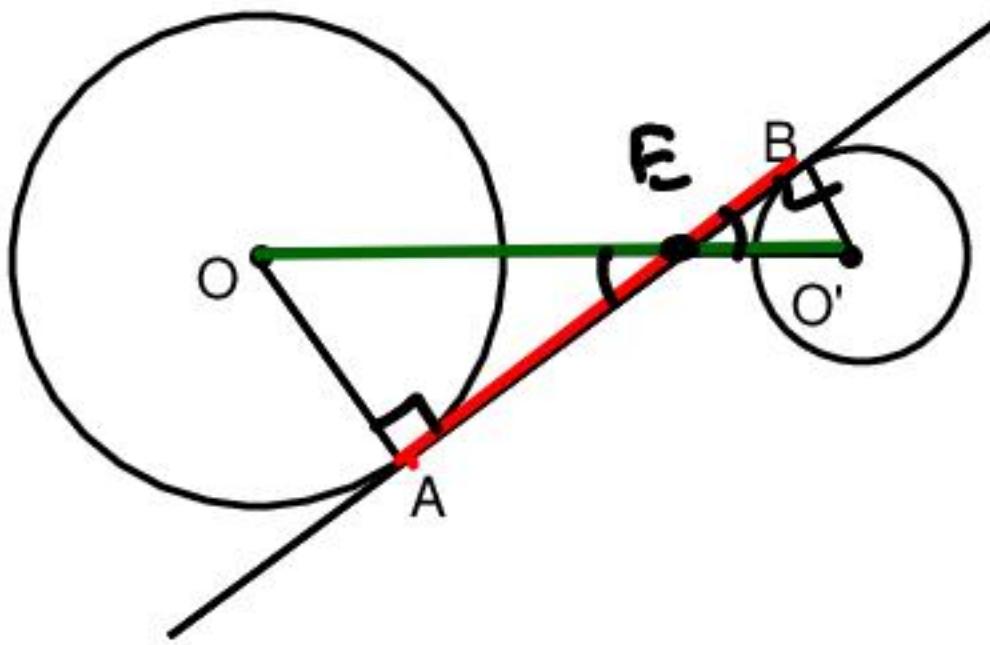
$$\frac{AC}{BC} = \frac{2}{1}$$



$$\underline{\underline{BC = 12 \text{ cm}}}$$

Ans. BC = 12 cm

Point E divides OO' internally in $R : r$



$$\Delta OEA \sim \Delta O'EB$$

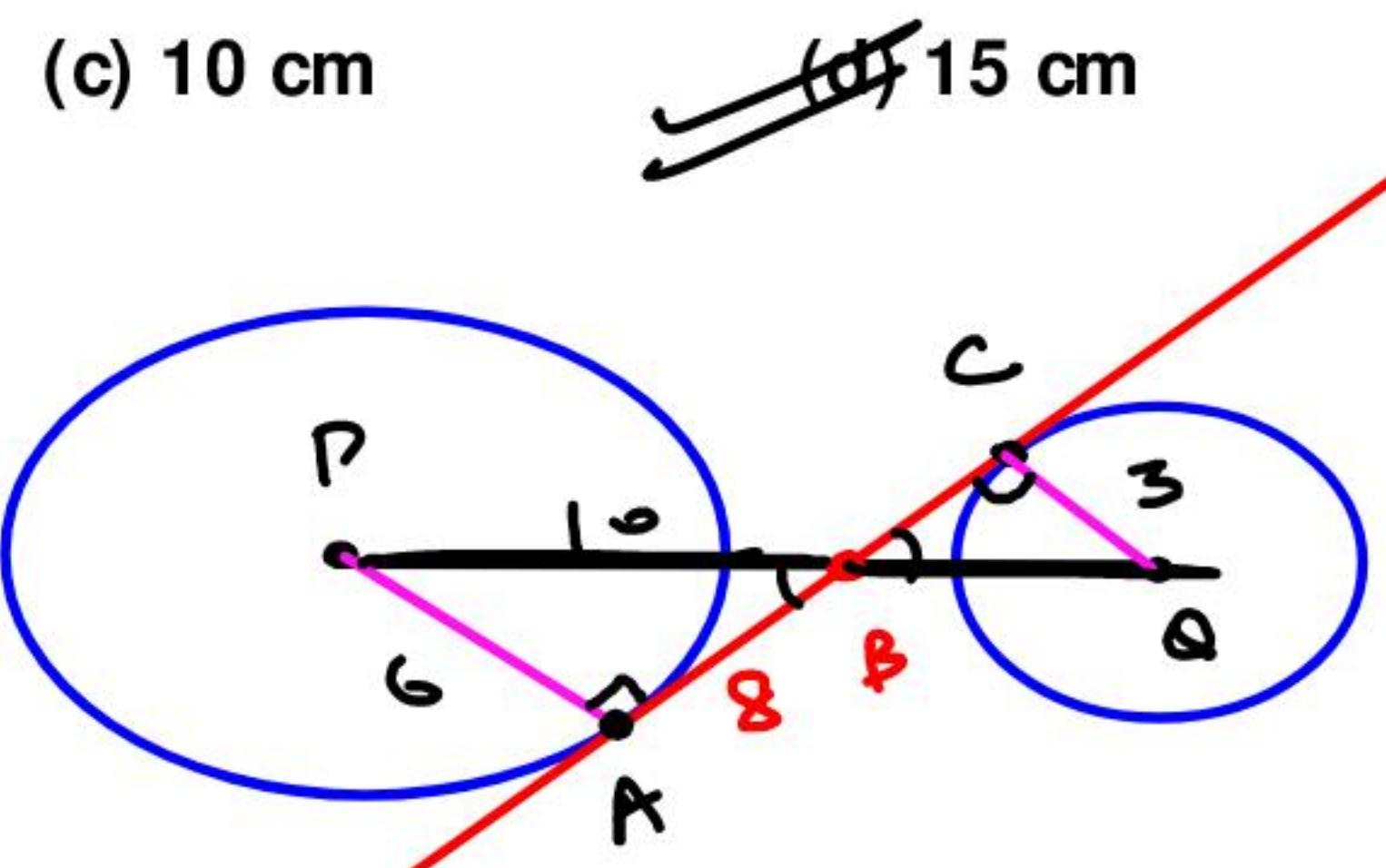
$$\frac{EO}{EO'} = \frac{AO}{BO'}$$

$$\frac{OE}{O'E} = \frac{R}{r}$$

Point E divides OO' internally in ratio $R : r$

Eg7. AC is transverse common tangent to two circles with centres P and Q and radii of 6 cm and 3 cm at the point A and C respectively. If AC cuts PQ at the point B and AB = 8 cm then the length of PQ is:

- (a) 13 cm
- (b) 12 cm
- (c) 10 cm



~~15 cm~~

$$\Delta ABP \sim \Delta CBQ$$

$$\frac{AB}{CB} = \frac{PB}{QB} = \frac{PA}{QC}$$

$$\frac{8}{CB} = \frac{PB}{QB} = \frac{2}{1}$$

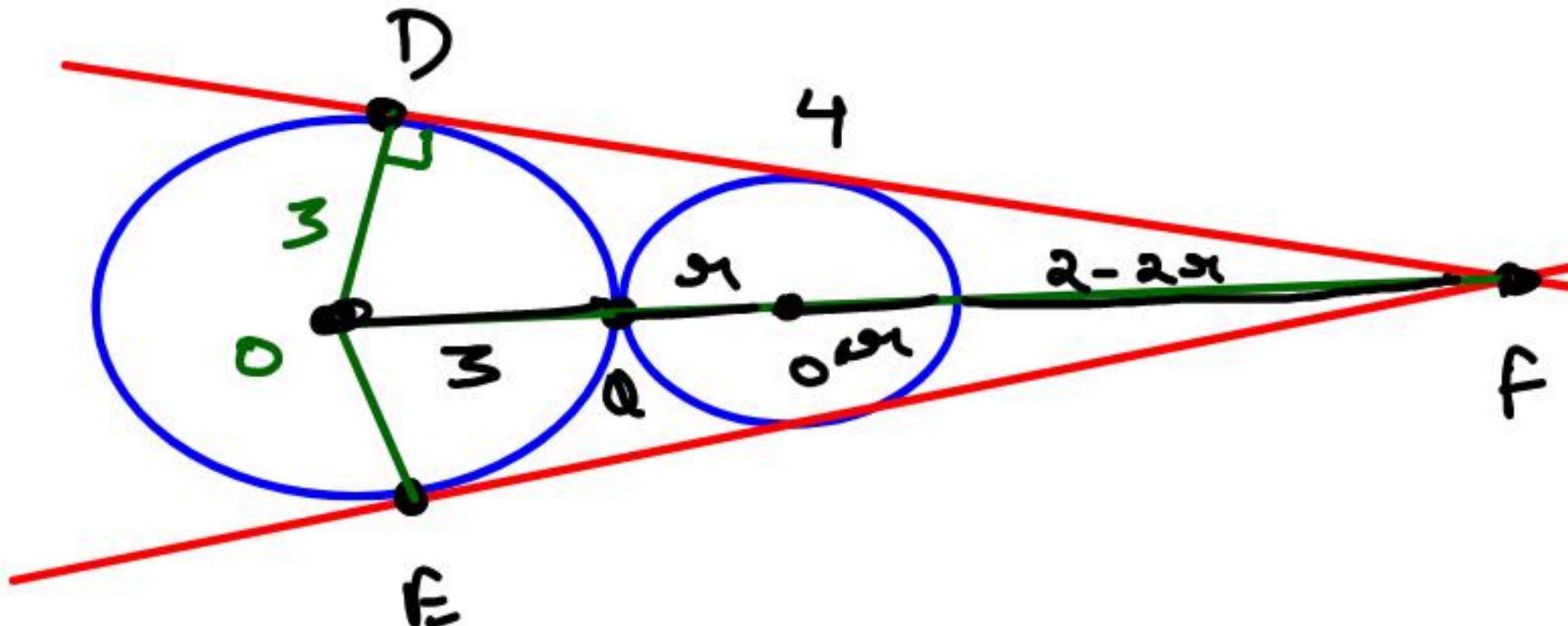
PQ = 15 cm

QB = 5

Ans. (d)

Eg8. Two circles touch each other at point Q. Two common tangents to the circles none of which passes through Q meet at point F. These tangents touch the larger circle at points D and E respectively. If radius of larger circle is 3 cm, $DF = 4$ cm. Find the radius of smaller circle. 3/4 cm

2 min



$$OF = 5 \text{ cm}$$

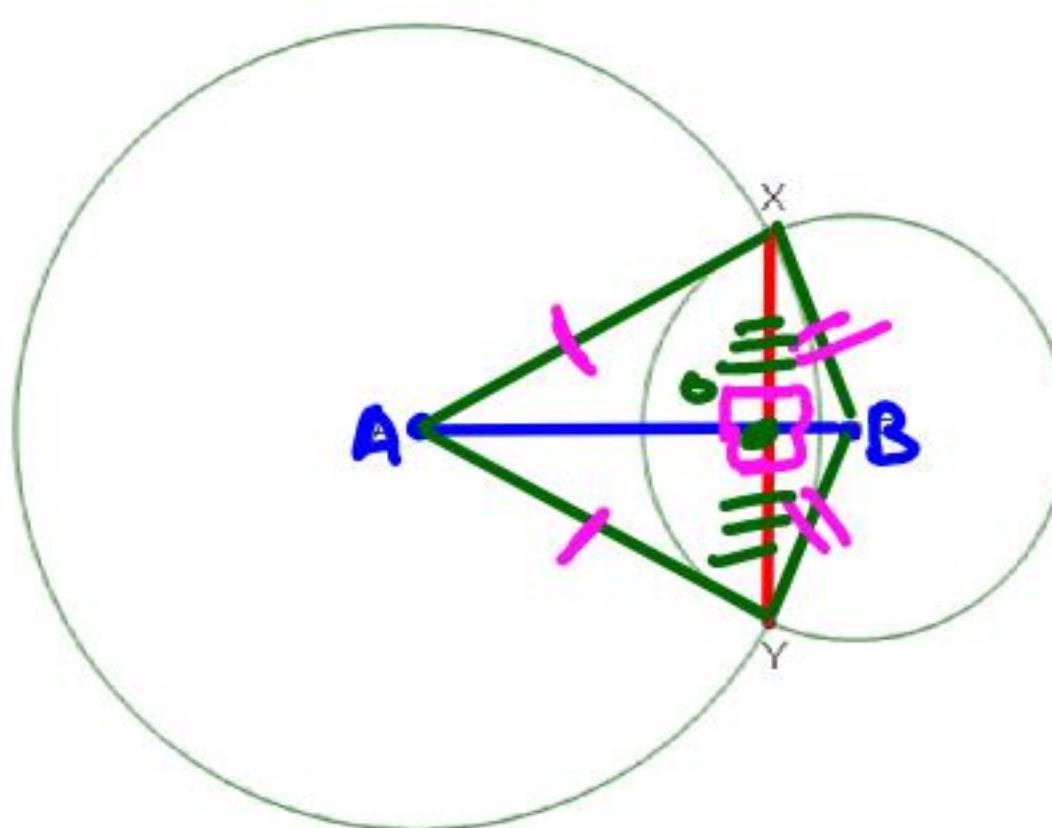
$$\frac{OF}{O'F} = \frac{3}{x}$$

$$\frac{5}{2-x} = \frac{3}{x}$$

$$5x = 6 - 3x \quad [x = 3/4]$$

Ans. $\frac{3}{4}$

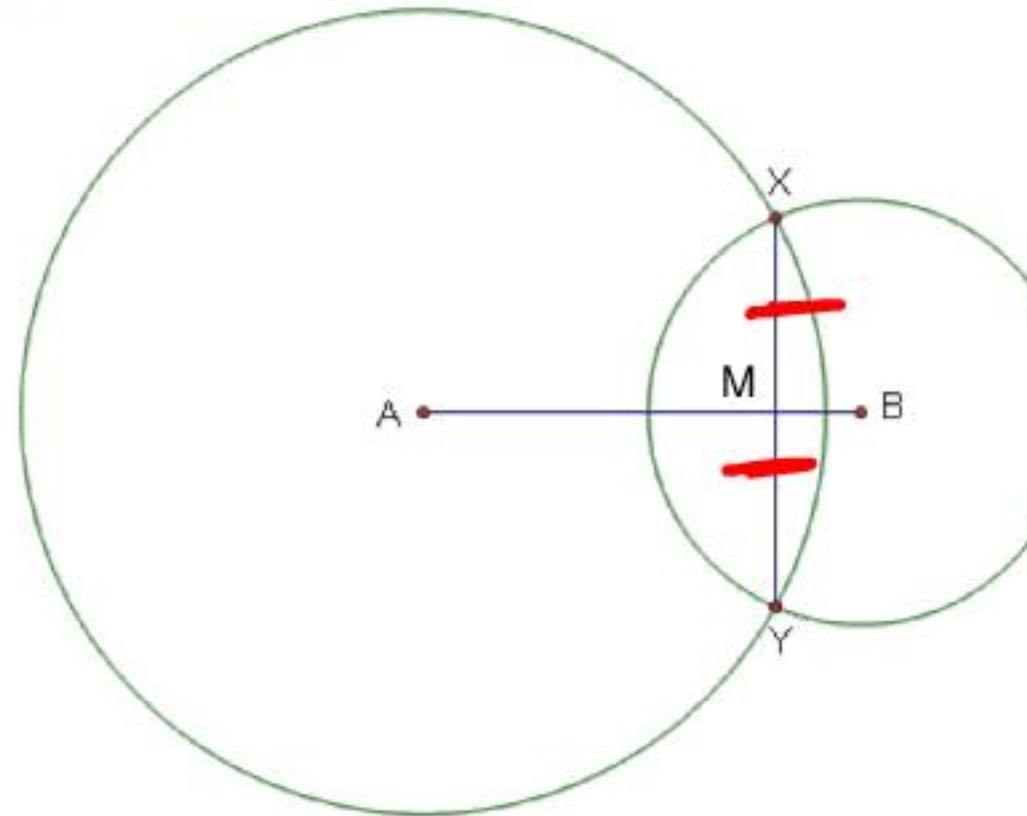
Common Chord



Line joining the centres will always bisects the common chord and will also be a perpendicular to it.

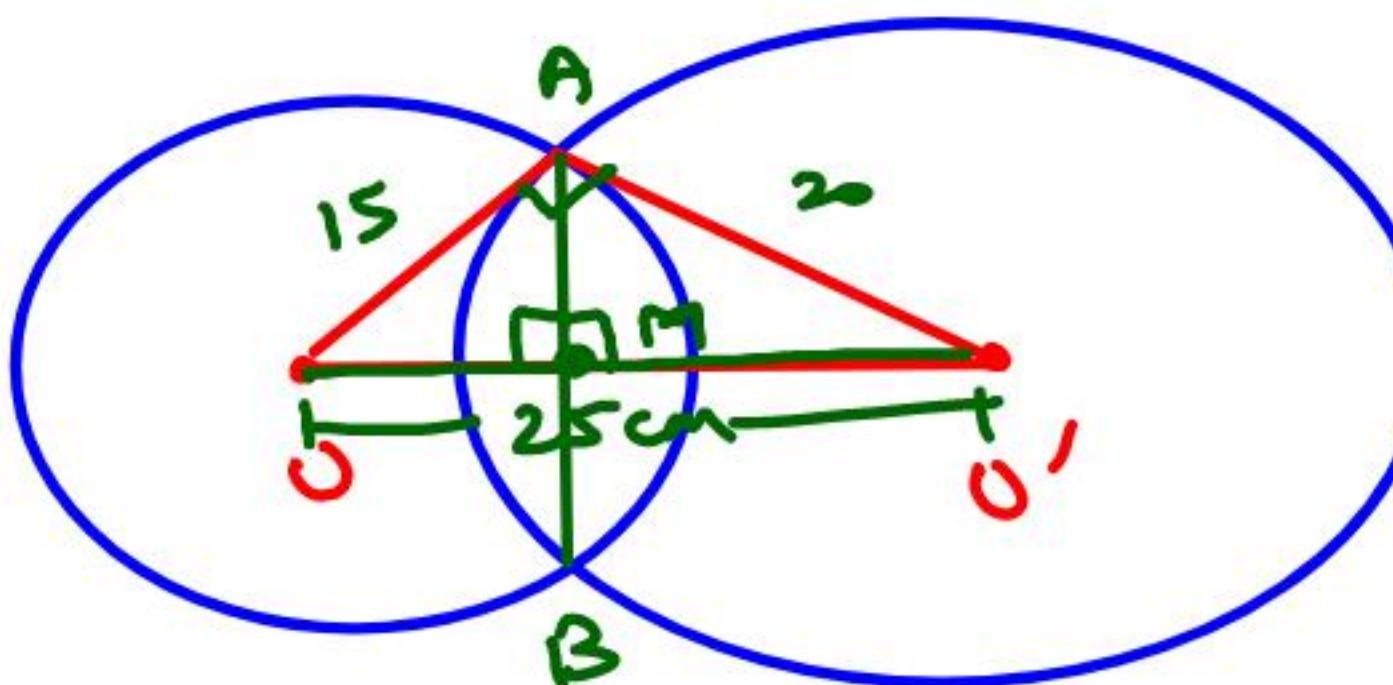
$$XO = YO$$

$\angle AXY \rightarrow$ we don't know



- (i) $\angle XM A = \angle XM B = 90^\circ$
- (ii) $XM = MY$
- (iii) $\angle AXB$ is not necessarily 90° .

Eg9. Find the length of the common chord of two intersecting circles of radii 15 cm and 20 cm whose centres are 25 cm apart.



$$25 \cdot AM = 15 \cdot 20$$

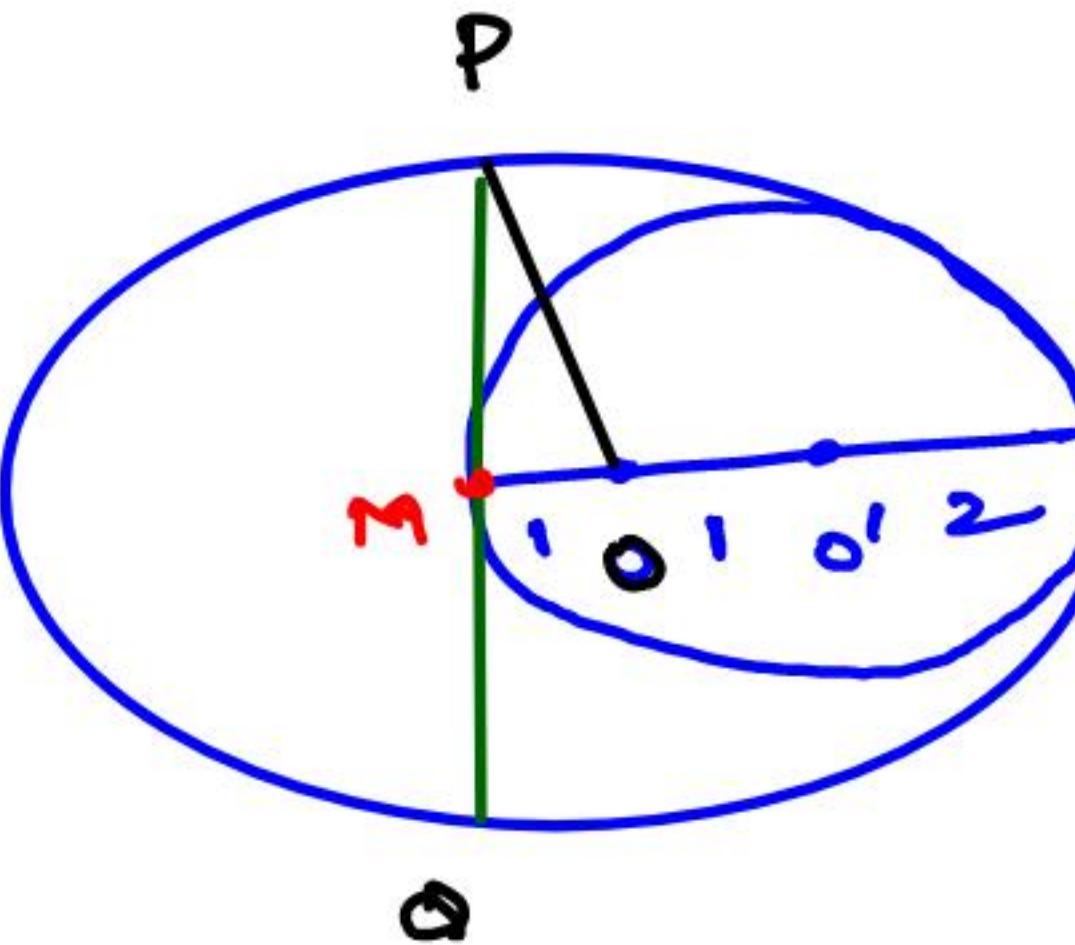
$$AM = 12$$

$$\underline{AB = 24\text{cm}}$$

Ans. 24 cm

Eg10. Two circles touch each other internally. Their radii are 2 cm and 3 cm. The biggest chord of the greater circle which is outside the inner circle is of length.

- (a) $2\sqrt{2}$ cm
- (b) $3\sqrt{2}$ cm
- (c) $2\sqrt{3}$ cm
- (d) $4\sqrt{2}$ cm



$$OP = 3$$

$$OM = 1$$

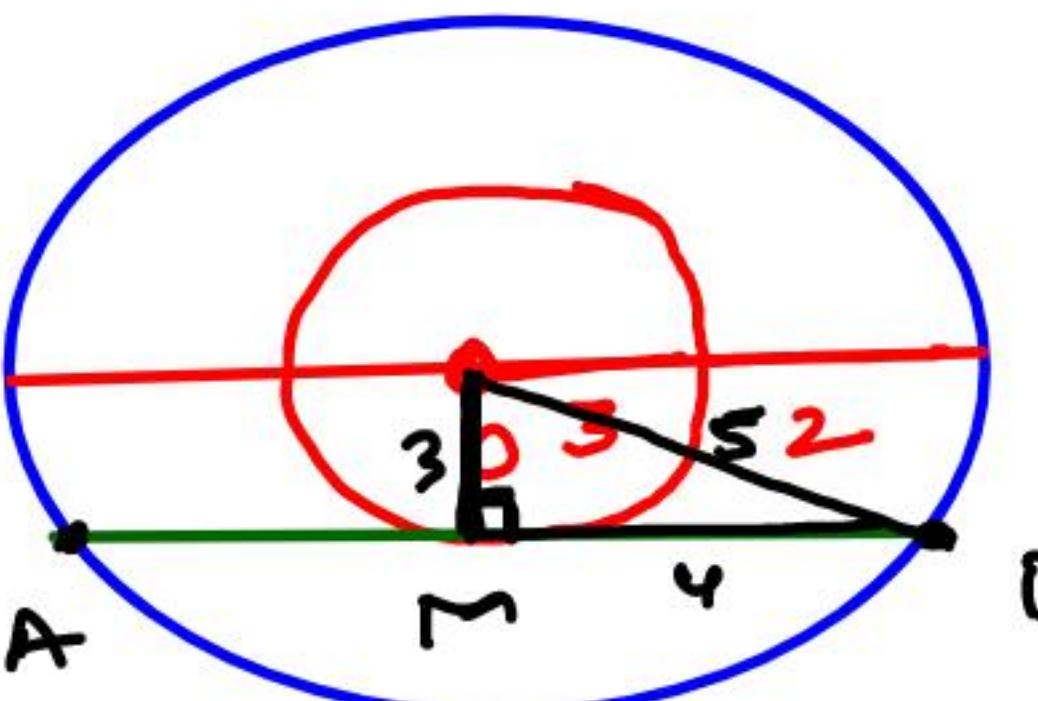
$$MP = \sqrt{8} = 2\sqrt{2}$$

$$\underline{\underline{PQ = 4\sqrt{2} \text{ cm}}}$$

Ans. (d)

Eg11. If two concentric circles are of radii 5 cm and 3 cm, then the length of the chord of the longer circle which touches the smaller circle is:

- (a) 6 cm
- (b) 7 cm
- (c) 10 cm
- (d) 8 cm



$$MB = 5$$

$$AB = 8$$



Ans. (d)

HOMEWORK

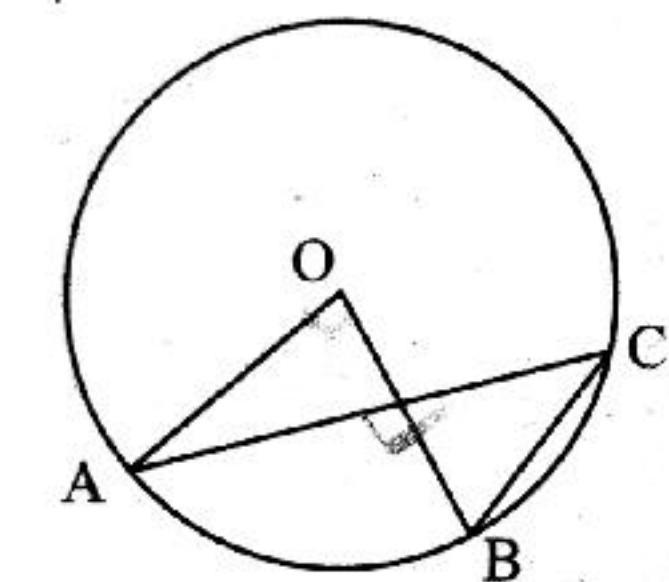
Q1. In the figure given above $\angle AOB = 46^\circ$, AC and OB intersect each other at right angles. What is the measure of $\angle OBC$ (where O is the centre of the circle)?

(a) 44°

(b) 46°

(c) 67°

(d) 78.5°



Ans. (c)

Q2. XY and XZ are tangent to a circle, ST is another tangent to the circle at the point R on the circle, which intersects XY and XZ at S and T respectively. If $XY = 15 \text{ cm}$ and $TX = 9 \text{ cm}$, then RT is

- (a) 4.5 cm
- (b) 7.5 cm
- (c) 6 cm
- (d) 3 cm

Ans. (c)

- Q3. Diameter AOB of a circle is extended such that it intersect extended chord CD at E outside the circle. If $\angle AOC = 50^\circ$, $\angle AEC = 15^\circ$. Find $\angle BOD$. (O is the centre of the circle)
- A. 10° B. 20° C. 40° D. 5°

Ans. (B)

Q4. ABCD is a cyclic trapezium with $AB \parallel DC$ and AB = diameter of the circle. If $\angle CAB = 30^\circ$, then $\angle ADC$ is:

- (a) 60°
- (b) 120°
- (c) 150°
- (d) 30°

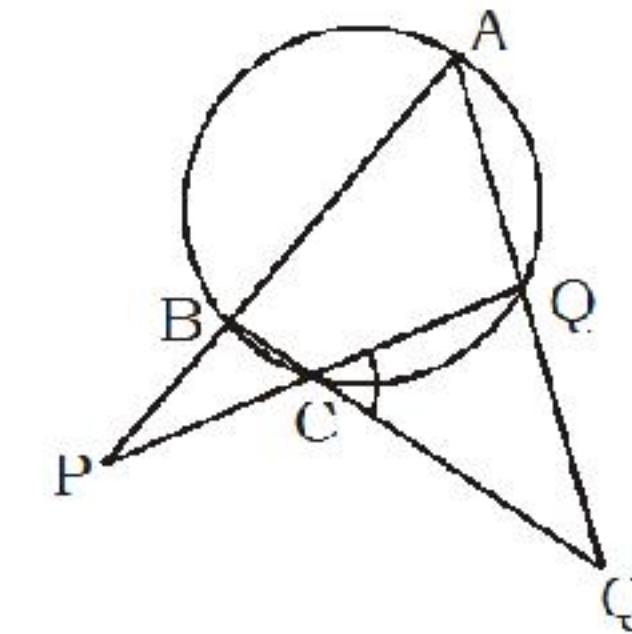
Ans. (b)

- Q5.** ABCD is a cyclic quadrilateral and O is the centre of the circle.
If $\angle COD = 140^\circ$ and $\angle BAC = 40^\circ$, then the value of $\angle BCD$ is equal to:
(a) 70° (b) 90° (c) 60° (d) 80°

Ans. (a)

Q6. In the given figure, if $x/3 : y/4 : z/5$, where $\angle DCQ = x$, $\angle BPC = y$ and $\angle DQC = z$, then what are the values of x, y and z respectively?

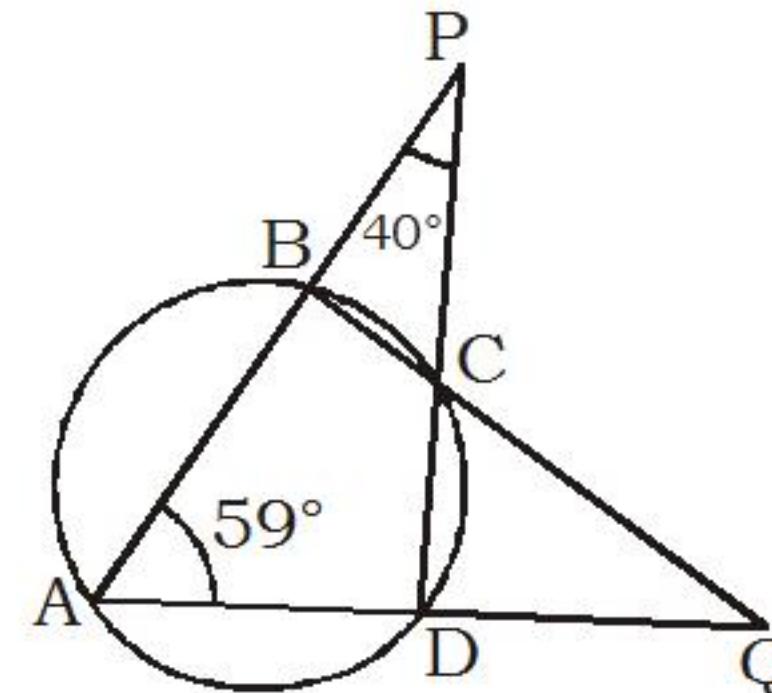
- (a) 30° , 44° and 55°
- (b) 36° , 48° and 60°
- (c) 39° , 52° and 65°
- (d) 42° , 56° and 70°



Ans. (b)

Q7. In the given figure, if $\angle PAQ = 59^\circ$,
 $\angle APD = 40^\circ$, then what is $\angle AQB$?

- (a) 19°
- (b) 20°
- (c) 22°
- (d) 27°



Ans. (c)

Q8. Each of the circles of equal radii with centres A and B pass through the centre of each other circle they cut at C and D then $\angle DBC$ is equal to:

- (a) 60° (b) 100° (c) 120° (d) 140°

Ans. (c)

Q9. The length of the common chord of two circle of radii 30 cm and 40 cm whose centres are 50 cm apart, is (in cm)

- (a) 12
- (b) 24
- (c) 36
- (d) 48

Ans. (d)

Q10. P and Q are centre of two circles with radii 9 cm and 2 cm respectively where $PQ = 17$ cm. R is the centre of another circle of radius x cm, which touches each of the above two circles externally. If $\angle PRQ = 90^\circ$, then the value of x is:

- (a) 4 cm (b) 6 cm (c) 7 cm (d) 8 cm

Ans. (b)

Q11. The radius of two concentric circles are 17 cm and 10 cm. A straight line ABCD intersects the larger circle at the point A and D and intersects the smaller circle at the points B and C. If BC = 12 cm, then the length of AD (in cm) is:

(a) 20

(b) 24

(c) 30

(d) 34

Ans. (c)

Q12. The distance between the centres of two circle having radii 4.5 cm and 3.5 cm respectively is 10 cm. What is the length of the transverse common tangent of these circles?

- (a) 8 cm
- (b) 7 cm
- (c) 6 cm
- (d) None of these

Ans. (c)

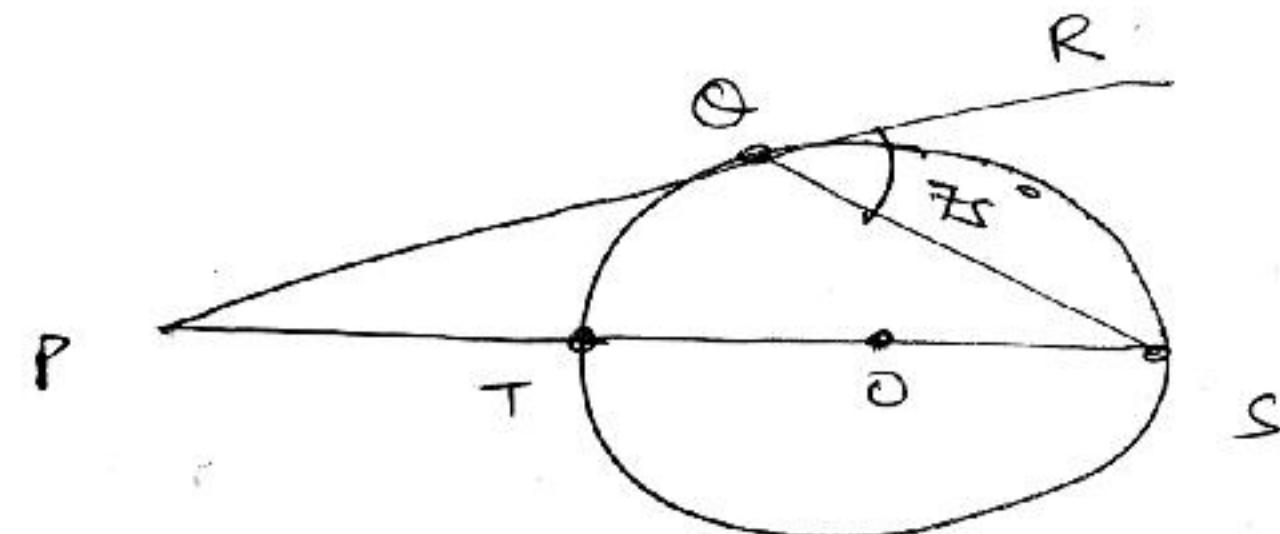
Q13. With A, B and C as centres, three circles are drawn such that they touch each other externally. If the sides of the ΔABC are 4 cm, 6 cm and 8 cm then what is the sum of the radius of the circles?

- (a) 9 cm
- (b) 10 cm
- (c) 12 cm
- (d) 14 cm

Ans. (a)

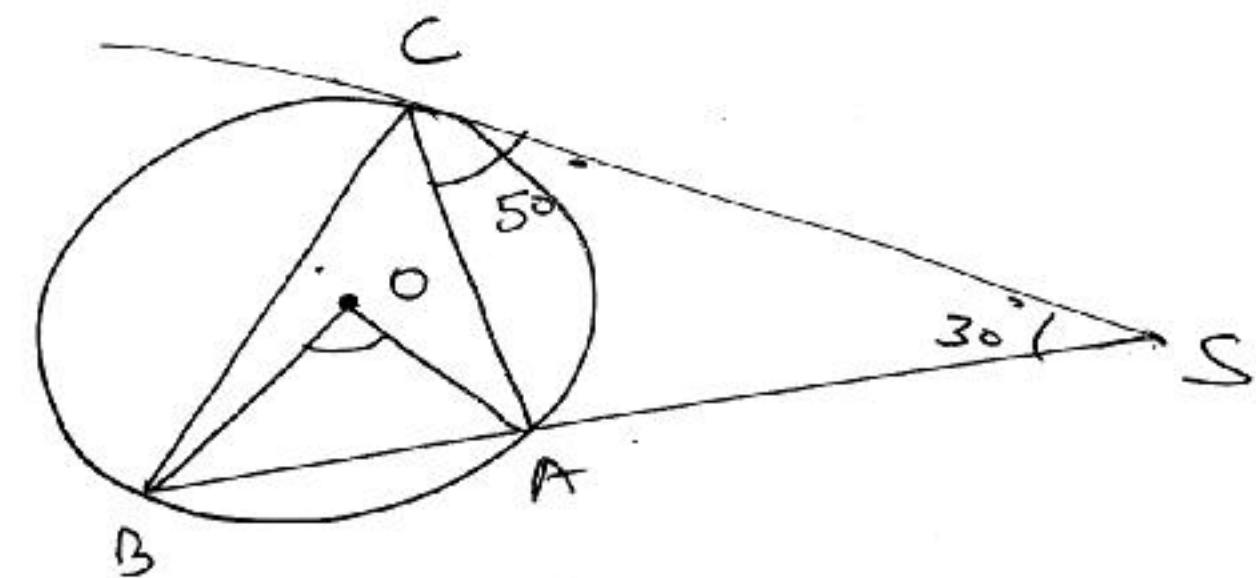
Q14. In the following figure PQR is a tangent to a circle with centre O.

If $\angle RQS = 75^\circ$, find $\angle QPS = ??$



Ans. $\angle QPS = 60^\circ$

Q15. In the figure, A, B and C are 3 points on a circle with centre O. The chord BA is extended to point S such that CS becomes a tangent to the circle at point C. If $\angle ASC = 30^\circ$, $\angle ACS = 50^\circ$; Find $\angle BOA = ??$

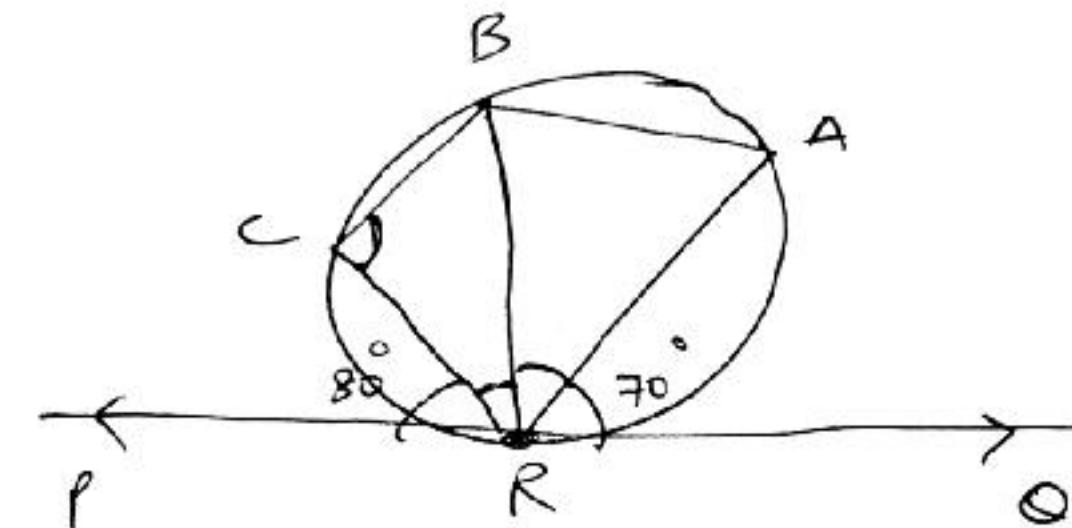


Ans. $\angle BOA = 100^\circ$

Q16. In the figure, PQ is a tangent touching the circle at point R.

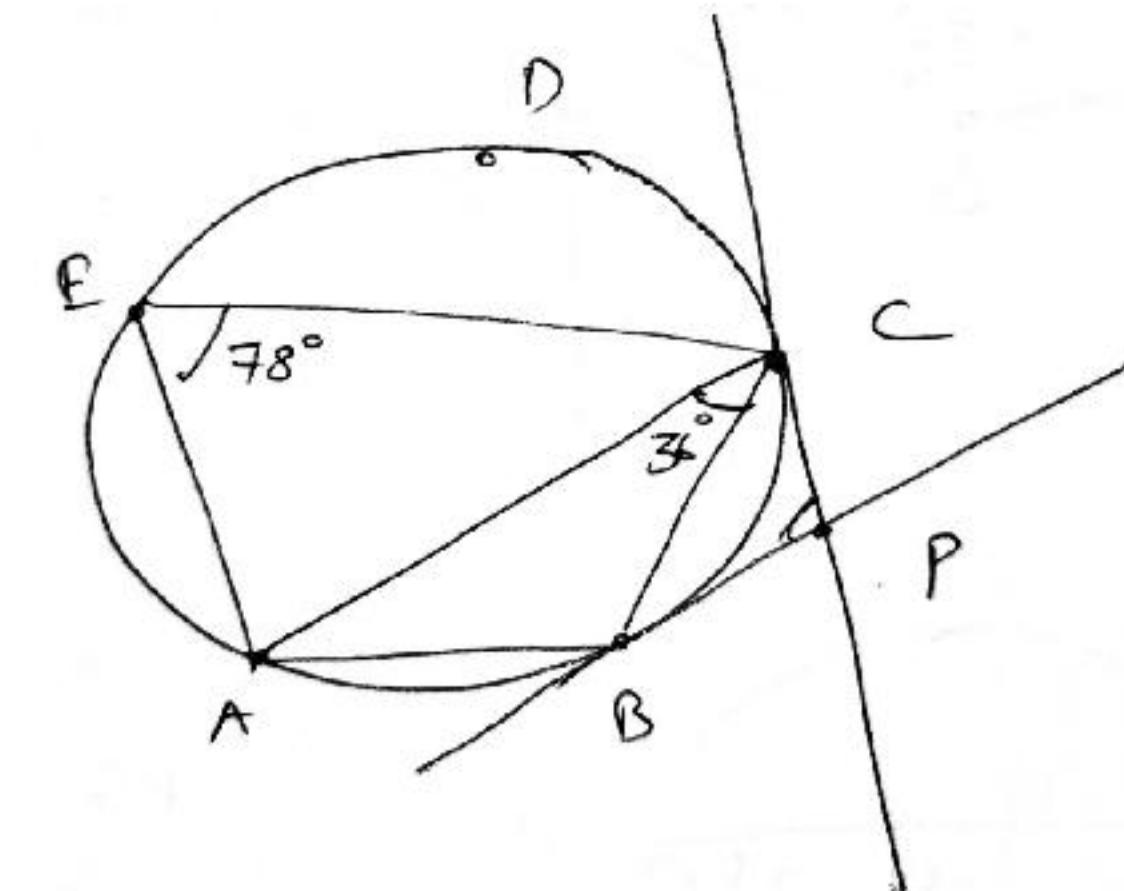
$$\angle QRA = 70^\circ, \angle PRC = 80^\circ$$

If RB bisects $\angle CRA$. Find $\angle RCB$



Ans. $\angle RCB = 85^\circ$

Q17. A pentagon ABCDE is inscribed in a circle. From a point P outside the circle two tangents which touch the circle at B and C respectively are drawn.
If $\angle BCA = 36^\circ$, $\angle AEC = 78^\circ$; Find $\angle BPC = ??$



Ans. $\angle BPC = 96^\circ$

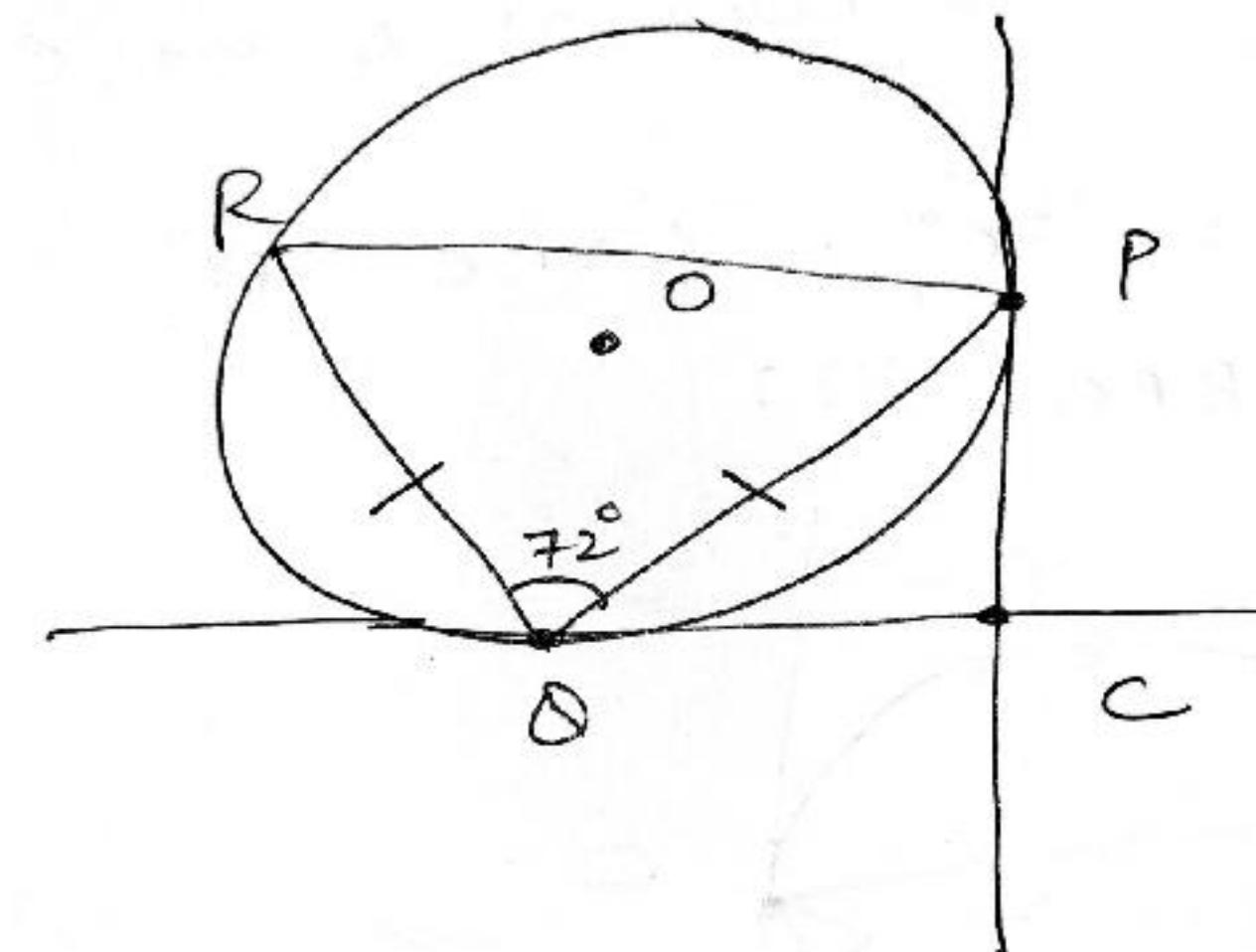
Q18. In the given figure,

$PQ = RQ$ and $\angle RQP = 72^\circ$

PC and QC are tangents

O is the centre.

Find $\angle PCQ = ??$

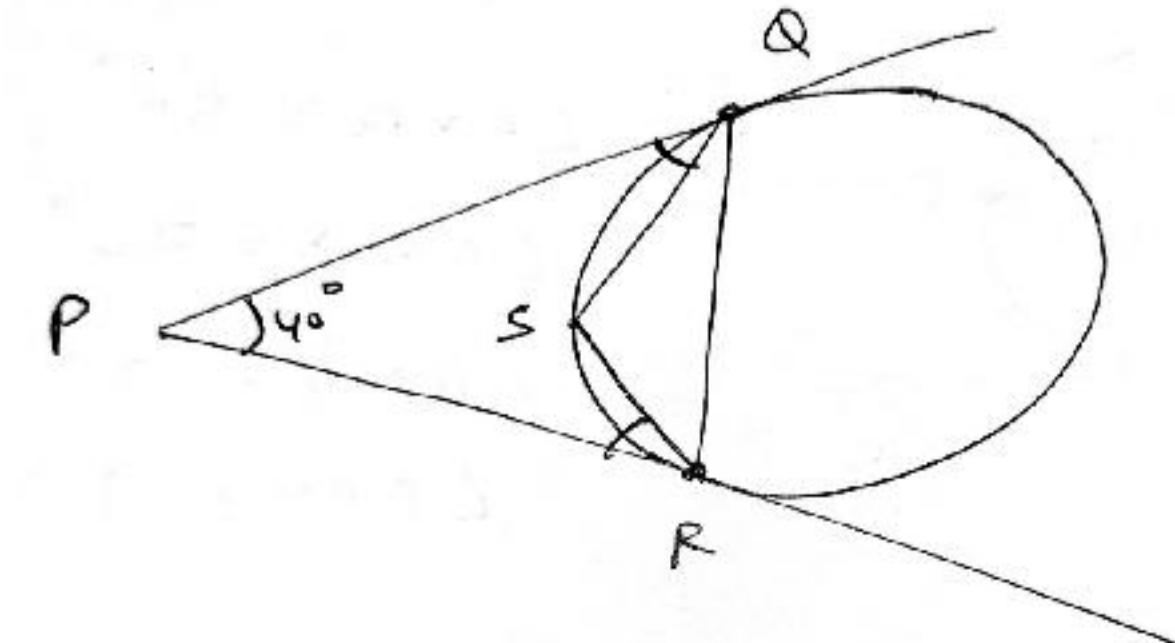


Ans. $\angle PCQ = 72^\circ$

Q19. PQ and PR are tangents drawn from external point.

If $\angle RPQ = 40^\circ$

Find $\angle PQS + \angle PRS = ??$

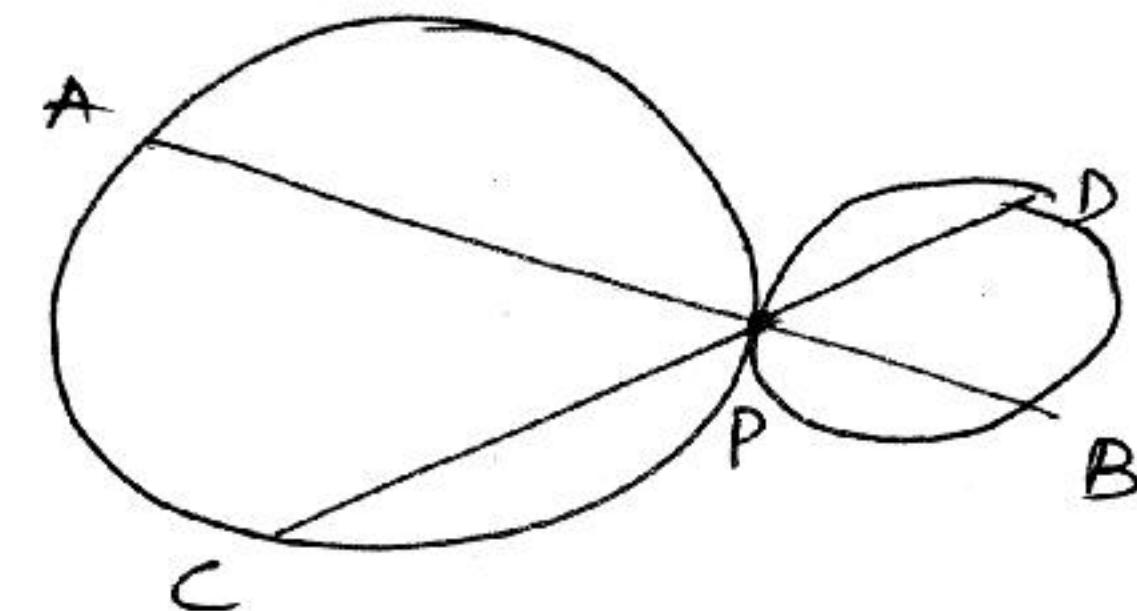


Ans. $\angle PQS + \angle PRS = 70^\circ$

Q20. Both circles are touching each other
there are two chords AB and CD which
pass through point of contact P.

If $AP = 12 \text{ cm}$, $PC = 4 \text{ cm}$, $PD = 6 \text{ cm}$

Find $PB = ??$

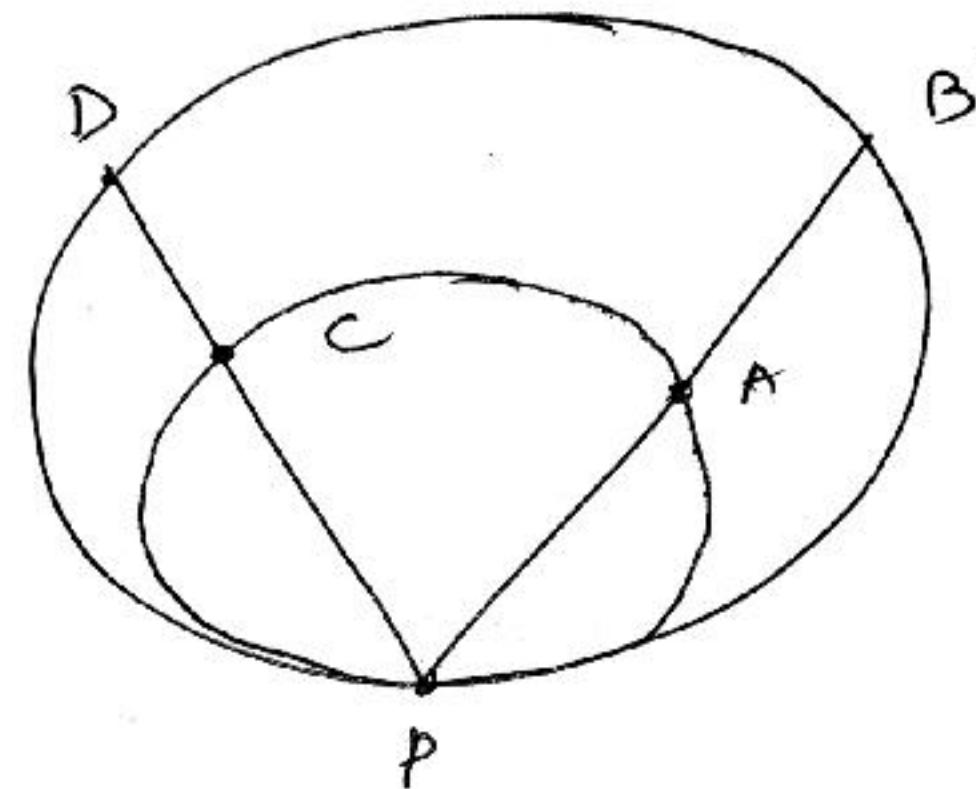


Ans. PB = 18 cm

Q21. Both circles are touching internally.

If $PA = 8 \text{ cm}$, $AB = 4 \text{ cm}$, $PC = 12 \text{ cm}$

Find $CD = ??$



Ans. CD = 6 cm

Q22. From an external point T, 13 cm away from the centre O of the circle of radius 5 cm, the two tangents PT and QT are drawn. What is the length of PQ?

(a) $\frac{19}{3}$ cm

(b) $\frac{40}{13}$ cm

(c) $\frac{22}{3}$ cm

(d) $\frac{20}{3}$ cm

Ans. (d)

Q23. Two equal circles of radius 4 cm intersect each other such that each passes through the centre of the other. The length of the common chord is:

(a) $2\sqrt{3}$ cm

(c) $2\sqrt{2}$ cm

(b) $4\sqrt{3}$ cm

(d) 8 cm

Ans. (b)

Q24. If the radii of two circles be 6 cm and 3 cm and the length of the transverse common tangent be 8 cm, then the distance between the two centres is:

- (a) $\sqrt{145}$ cm
- (b) $\sqrt{140}$ cm
- (c) $\sqrt{150}$ cm
- (d) $\sqrt{135}$ cm

Ans. (a)

Q25. Two circles with radii 25 cm and 9 cm touch each other externally. The length of the direct common tangent is:

- (a) 34 cm
- (b) 30 cm
- (c) 26 cm
- (d) 32 cm

Ans. (b)

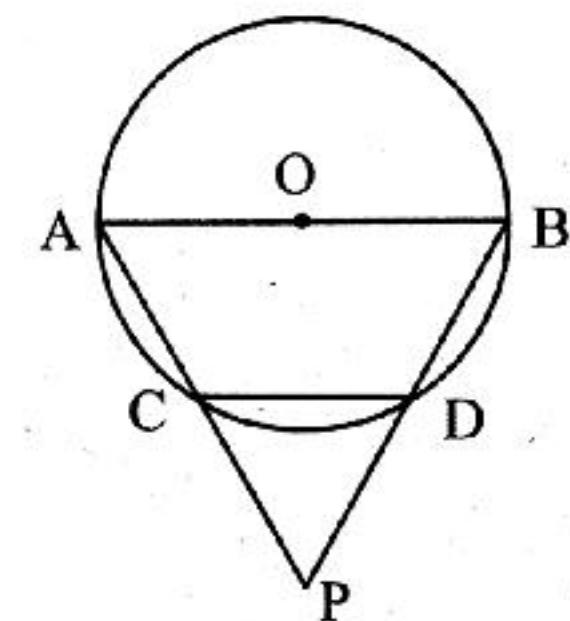
Q26. ABCD is a cyclic trapezium whose sides AD and BC are parallel to each other. If $\angle ABC = 75^\circ$ then the measure of $\angle BCD$ is:

- (a) 75°
- (b) 95°
- (c) 45°
- (d) 105°

Ans. (a)

Q27. In the figure given below $AO = CD$, where O is the centre of the circle. What is the value of $\angle APB$?

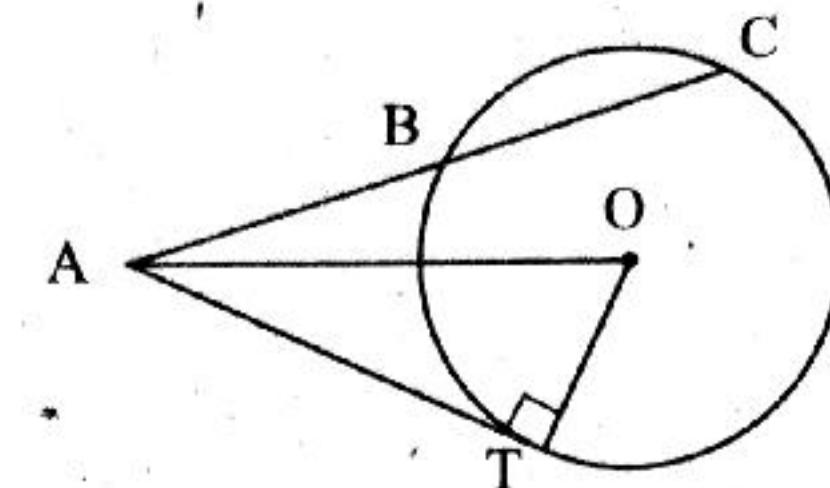
- (a) 60°
- (b) 50°
- (c) 45°
- (d) 30°



Ans. (a)

Q28. In the given fig., AT is a tangent of a circle of radius 6 cm. If A is at a distance of 10 cm from the centre O and $AB = 5$ cm, then what is the length of the chord BC?

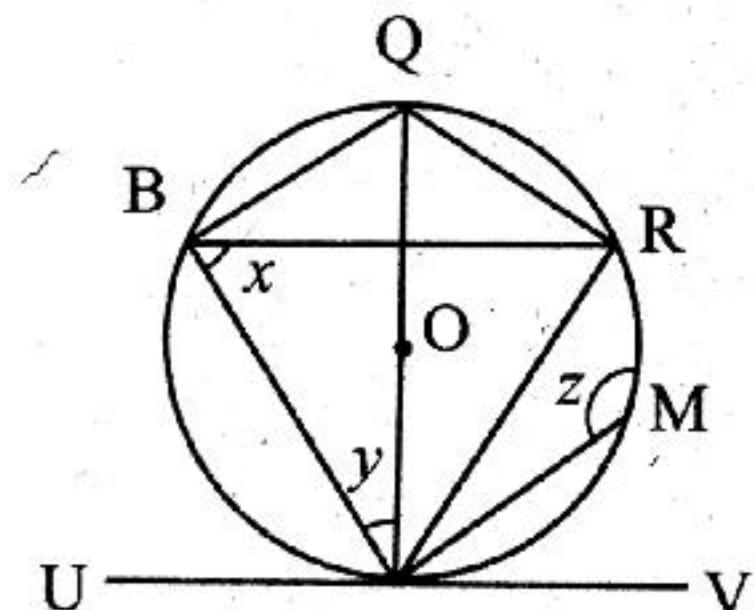
- (a) 7.8 cm
- (b) 8 cm
- (c) 8.4 cm
- (d) 9 cm



Ans. (a)

Q29. In the given figure, O is the centre of the circle. The line UTV is a tangent to the circle at T, $\angle VTR = 52^\circ$ and ΔPTR is an isosceles triangle such that $TP = TR$. What is $\angle x + \angle y + \angle z$ equal to?

- (a) 175°
- (b) 208°
- (c) 218°
- (d) 250°



Ans. (c)

Q30. The length of a chord of a circle is equal to the radius of the circle. The angle which this chord subtended in the major segment of the circle is equal to

- (a) 30°
- (b) 45°
- (c) 60°
- (d) 90°

Ans. (a)

Q31. A chord AB of a circle C_1 of a radius $(\sqrt{3} + 1)$ cm touches a circle C_2 which is concentric to C_1 . If the radius of C_2 is $(\sqrt{3} - 1)$ cm, the length of AB is:

- (a) $2\sqrt[4]{3}$ cm**
- (b) $8\sqrt{3}$ cm**
- (c) $4\sqrt[4]{3}$ cm**
- (d) $4\sqrt{3}$ cm**

Ans. (c)

Q32. Chords AB and CD of a circle intersect at E and are perpendicular to each other. Segments AE, EB and ED are of lengths 2 cm 6 cm and 3 cm respectively. Then the length of the diameter of the circle (in cm) is

- (a) $\sqrt{65}$
- (b) $\sqrt{62}$
- (c) 65
- (d) $\frac{65}{2}$

Ans. (a)

Q33. Two circles with centre P and Q intersect at B and C, A, D are points on the circle such that A, C, D are collinear. If $\angle APB = 130^\circ$, and $\angle BQD = x^\circ$, then the value of x is

- (a) 65 (b) 130 (c) 195 (d) 135

Ans. (b)

Q34. Two circles intersect each other at the points A and B. A straight line parallel to AB intersects the circles at C, D, E and F. If $CD = 4.5 \text{ cm}$, then the measure of EF is:

- (a) 1.50 cm
- (b) 2.25 cm
- (c) 4.50 cm
- (d) 9.00 cm

Ans. (c)

Q35. Two circles having radii 4 units intersect each other in such a way that each of them passes through the centre of the other. Then the length of their common chord is:

- (a) $\sqrt{2}$ r units
- (b) $\sqrt{3}$ r units
- (c) $\sqrt{5}$ r units
- (d) 4 units

Ans. (b)

Q36. The diagonals AC and BD of a cyclic quadrilateral ABCD intersect each other at the point P. Then, it is always true that:

- (a) $BP \times AB = CD \times CP$
- (b) $AP \times CP = BP \times DP$
- (c) $AP \times BP = CP \times DP$
- (d) $AP \times CD = AB \times CP$

Ans. (b)

Q37. A circular ring with centre O is kept in the vertical position by two weightless thin strings TP and TQ attached to the ring at P and Q. The line OT meets the ring at E where as a tangential string at E meets TP and TQ at A and B respectively. If the radius of the ring is 5 cm and $OT = 13 \text{ cm}$, then what is the length of AB?

- (a) $10/3 \text{ cm}$ (b) $20/3 \text{ cm}$ (c) 10 cm (d) $40/3 \text{ cm}$

Ans. (b)

Q38. ABC is an equilateral triangle inscribed in a circle with $AB = 5 \text{ cm}$. Let the bisector of the angle A meet BC in X and the circle in Y. What is the value of $AX \times AY$?

- (a) 16 cm^2
- (b) 20 cm^2
- (c) 25 cm^2
- (d) 30 cm^2

Ans. (c)

Q39. In a ΔABC , $AB = AC$. A circle through B touches AC at D and intersects AB at P. If D is the mid point of AC, then which one of the following is correct?

- (a) $AB = 2AP$
- (b) $AB = 3AP$
- (c) $AB = 4AP$
- (d) $2AB = 5AP$

Ans. (c)

Q40. N is the foot of the perpendicular from a point P of a circle with radius 7 cm, on a diameter AB of the circle. If the length of the chord PB is 12 cm, the distance of the point N from the point B is:

- (a) $6\frac{5}{7}$ cm
- (b) $12\frac{2}{7}$ cm
- (c) $3\frac{5}{7}$ cm
- (d) $10\frac{2}{7}$ cm

Ans. (d)

Q41. I and O are respectively the in-centre and circumcentre of a triangle ABC.

The line AI produced intersects the circumcircle of ΔABC at the point D. If

$$\angle ABC = x^\circ, \angle BID = y^\circ \text{ and } \angle BOD = z^\circ, \text{ then } \frac{z + x}{y} = ?$$

(a) 3

(b) 1

(c) 2

(d) 4

Ans. (c)

Q42. Two chords AB and CD of circle whose centre is O, meet at the point P and $\angle AOC = 50^\circ$, $\angle BOD = 40^\circ$. Then the value of $\angle BPD$ is:

- (a) 60°
- (b) 40°
- (c) 45°
- (d) 75°

Ans. (c)

Q43. Two chords AB, CD of a circle with centre O intersect each other at P.

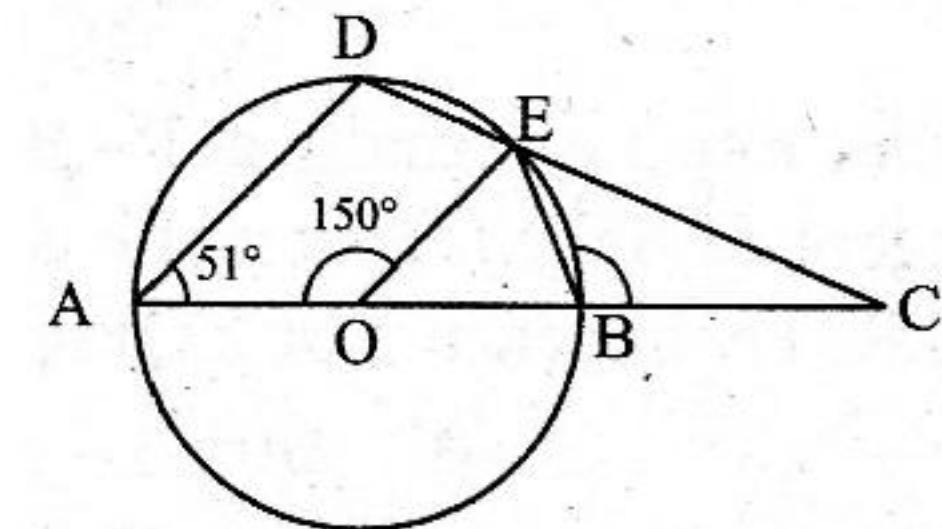
$\angle ADP = 23^\circ$ and $\angle APC = 70^\circ$, then $\angle BCD$ is:

- (a) 45°
- (b) 47°
- (c) 57°
- (d) 37°

Ans. (b)

Q44. In the following figure, AB be diameter of a circle whose centre is O, If $\angle AOE = 150^\circ$, $\angle DAO = 51^\circ$, then the measure of $\angle CBE$ is:

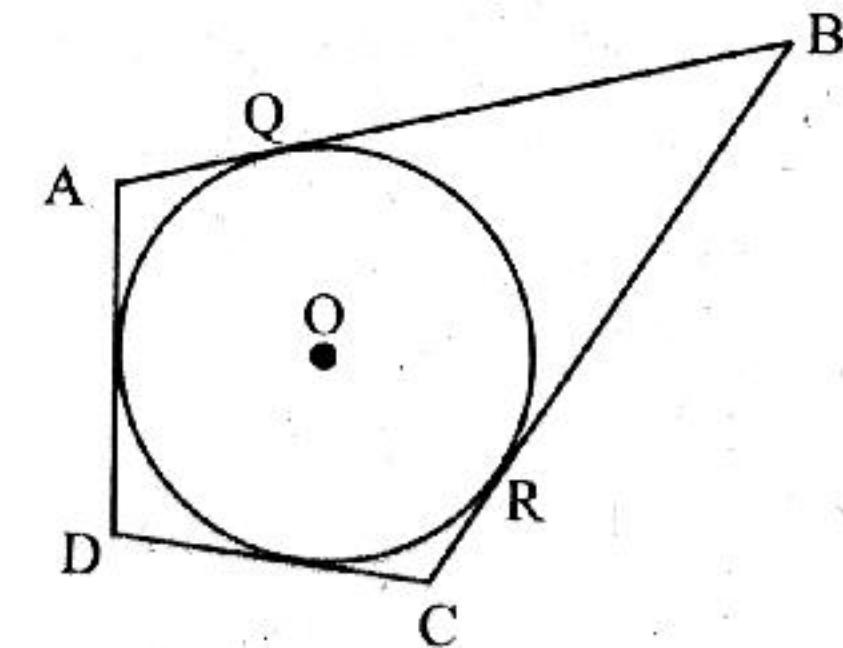
- (a) 115°
- (b) 110°
- (c) 105°
- (d) 120°



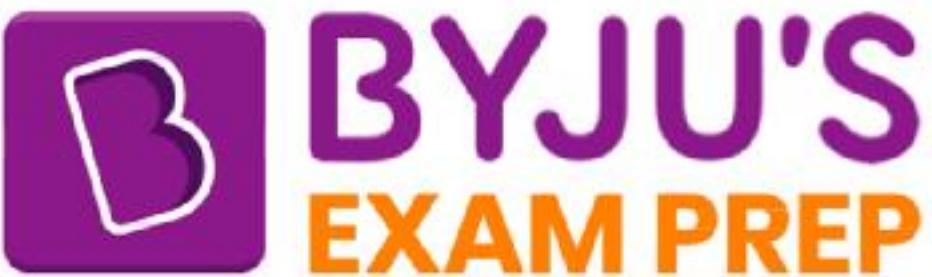
Ans. (c)

Q45. In the given figure, a circle is inscribed in a quadrilateral ABCD. Given that, $BC = 38 \text{ cm}$, $QB = 27 \text{ cm}$, $DC = 25 \text{ cm}$ and AD is perpendicular to DC . What is the radius of the circle?

- (a) 11 cm
- (b) 14 cm
- (c) 15 cm
- (d) 16 cm



Ans. (b)



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